# NETWORKWORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

**VOLUME 3, NUMBER 24** 

AUGUST 18, 1986

TERMINATION FEES

# User says no to AT&T fees

Bucks \$300k quit cost.

BY BOB WALLACE Senior Writer

CALIFORNIA — Although customer unrest over AT&T contract termination charges is old hat, recent legal battles regarding the fees have sparked new concern and brought disgruntled users out of the woodwork.

Responding to other user cases ("Users girding for AT&T lease fight," Network World, July 14), a large corporation here reported last week it is refusing to pay AT&T roughly \$300,000 in termination charges. Users must pay such charges if they opt to terminate prematurely certain long-term equipment lease agreements with AT&T. The volatile issue surfaced in the late 1970s and again shortly after the divestiture of AT&T.

Consultants claimed several thousand users throughout the nation are deciding whether to pay the charges or force AT&T to prove the enforceability of the contracts.

AT&T first asserted it would sue recalci-See **Terminations** page 42 ► SOFTWARE STRATEGIES

# Lotus busts user software shackles

Network, downloading options unwrapped.

### **BY MARY PETROSKY**

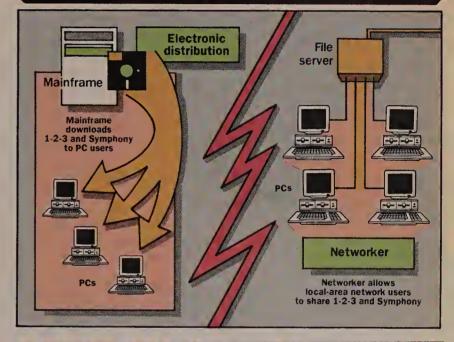
West Coast Corresponder

CAMBRIDGE, Mass. — Lotus Development Corp. dashed its single-copy-per-user program licensing policy last week with the introduction of a 10-pronged software support and delivery program that includes mainframe downloading and networking options for its popular 1-2-3 and Symphony packages.

Lotus, one of the largest independent software companies, has long been viewed as a critical holdout in the scurry for alternatives to the standard program-per-user license policy. The company's stance on the issue may ripple through the industry and set de facto standards.

Pressure to develop more flexible distribution schemes for its applications has See **Software** page 8

Lotus unveils new software distribution scheme and networking options



FEATURE FOCUS

### **Designing the human net**

Is your local net compatible with your users?

BY ALEXANDER RANDALL V

Special to Network World

Telling computer users that they should buy a local-area network on the basis of topology or bus speed is as inappropriate as telling potential car buyers to purchase an automobile because its transmission has an 8-to-1 gear ratio. To

the net user, it is the task that matters, in the same way that a car buyer's concern is whether or not the Little League team will fit in the station wagon.

Network users don't care about tokenpassing or carrier-sense multiple access with collision detection (CSMA/CD). They want to know if the network will

Continued on page 35

### DOCUMENT DISTRIBUTION

# **Burroughs joins Disoss disciples**

Delivery of link to office systems 'standard' marks a Bunch first.

BY PAUL KORZENIOWSKI

Senior Edite

DETROIT — The ground swell of support for IBM's Disoss gained momentum last week as Burroughs Corp. became the first of the so-called Bunch companies to deliver a product linking its computers to the strategic IBM office software.

Burrough's Ofisbridge enables its B25 series minicomputer users to send, modify and receive documents with Disoss, an electronic mail and library services application that runs under IBM's CICS teleprocessing monitor. Ofisbridge also emulates IBM's LU 6.2.

Support for Disoss is becoming a critical asset in the office automation market. IBM has labeled Disoss a strategic product, a classification typically reserved for its most important offerings, such as the Token-Ring Network and the System/36 minicomputer. Thus, Disoss has become a de facto standard in the office equipment arena, said Michael A. Brewer, program general manager for the workstations and office systems division at Burroughs.

Leading office systems suppliers such as Digital Equipment Corp., Wang Laboratories, Inc. and Data General Corp. have already shipped products that allow their processors to operate in the Disoss environment. Lee See Disoss page 38

### NETWORK LINE

News

Nynex Development Co. gambles \$10 million that the reg-

ulatory climate will change and it will some day be allowed to enter the long-distance business. Page 2.

AT&T's Federal Systems Division will, thanks to a \$66 mil-

lion FAA contract, design and install radio control equipment as part of the agency's air traffic network upgrade. Page 4.

Network Equipment Technologies flexes muscle in the T-1 mart with a powerful top-of-the-line mux that supports up to 96 T-1 lines. Page 42.

### Features

Today's analog telephone testing equipment can be programmed to initiate measurements automatically. Page 28.



### ► MATRIX SWITCHES

### AT&T to debut rumored switch at TCA

**BY JOHN DIX** 

Senior Editor

SAN DIEGO — AT&T will announce its long-rumored matrix switch at the annual Telecommunications Association conference to be held here next month, an AT&T insider told *Network World* last week. The switch, supplied by T-Bar, Inc., will be dovetailed into AT&T's Dataphone II product line.

AT&T would acknowledge neither the upcoming switch announcement nor any relationship with T-Bar. But specifications of the new device, referred to as the Dataphone II Star Switch in an internal AT&T document, correspond to details of T-Bar's Series 2001 Distributed Switch Matrix.

The Star Switch will range in size from 32 to 2,048 nonblocked ports and support RS-232 and V.35

interfaces, as well as analog devices and network monitoring equipment. It will be possible to configure the switch as a single-cabinet or multicabinet system and any switch port will be able to connect to any other switch port, the document said.

The announcement of the switch would put to rest a year of speculation about an AT&T and T-Bar switch deal and may also indicate that T-Bar is ready to deliver Galaxy, its high-end switch configuration. Presumably, AT&T would not announce the Star Switch until T-Bar could deliver a full-blown Galaxy switch, a configuration that the company has been late getting to market.

Although T-Bar has shipped many of its DSM Monoliths, standalone matrix switches with 320 ports, analysts said they have heard little about Galaxy since its introduction. Galaxy is a controller used to tie together individual Monoliths to reach the 2,048-port system capacity.

See Star page 5

### ► INDUSTRY INSIGHT

# Nynex wagers \$10m on long-distance market

Court OKs BOC's option bid on Tel-Optik.

**BY MARY PETROSKY** 

West Coast Correspondent

WASHINGTON, D.C. — Nynex Development Co. is gambling \$10 million that the regulatory climate will change by 1988, enabling it to enter the long-distance carrier business by exercising an option it acquired last week to buy Tel-Optik Ltd., a company building a transatlantic communications system.

In a recent ruling that supports the recommendations of the U.S. Department of Justice, U.S. District Court Judge Harold Greene decreed that the Bell operating companies may acquire options to purchase companies involved in business areas the BOCs are forbidden to enter by the strictures of the AT&T consent decree. The ruling marked the first time the question of whether

acquiring such an option is the equivalent of entering a prohibited business has arisen, according to a Justice Department attorney.

Judge Greene agreed with the department's view that a BOC must have substantial control of a business, not just hold an option to buy into that business, to be considered a participant in a prohibited venture. However, the BOCs must still get a waiver before exercising such an option. The decision resulted from a Nynex Development request to buy an option to purchase Tel-Optik, based here. Tel-Optik is in a joint partnership with Londonbased Cable and Wireless PLC to lay a fiber-optic cable between the U.S. and UK. The goal of the venture is to sell bulk transmission capacity to common carriers, govern-See Wager page 38

### ► LABOR RELATIONS

# Four BOCs still at odds with CWA; strikes flare

**BY NADINE WANDZILAK** 

One week after their contract expiration deadline, only three of the seven regional Bell holding companies have reached tentative agreements with the members of the Communications Workers of Amer-

ica (CWA).

CWA workers at Southwestern Bell Corp., BellSouth Corp. and Pacific Telesis Group had reached tentative accords by press time. But some 38,000 workers at Nynex Corp.'s two local telephone operating companies, New England Telephone and New York Telephone Co., remained on strike last week. Most of those employees, some 37,000, work in New York. About 1,000 work in New England, some 700 for Nynex and 260 for New England Telephone.

In support of the CWA, nearly 1,000 of the 17,000 members of the International Brotherhood of Electrical Workers (IBEW) in New England were honoring CWA picket lines last week, according to Ellen Boyd, manager of media relations at New England Telephone. About 80% of the 1.300 IBEW members who work for New York Telephone were honoring the CWA strike, according to David Bradley, district manager at New York Telephone. The IBEW reached a tentative agreement last week with the two Nynex telephone companies.

As a result of the strikes, New England Telephone is experiencing some delays in installations and repairs, Boyd said. In New York, repair service is "pretty close to normal at this point," Bradley said, although some customers had experienced problems.

Bradley said some 12,000 supervisors are filling in for about 24,000 striking CWA technicians. The strike has also affected directory assistance.

Most of the scattered strikes called by individual companies within other RBOCs had ended by week's end. At Ameritech, only workers at Ameritech Publications remained on the picket lines. Similarly, the US West Direct publications company of US West, Inc. remained on strike.

Negotiations were continuing at the end of the week on local issues at Bell Atlantic Corp., with a settlement near at hand, according to CWA spokesman Ed Lewinski.

Details of the Southwestern Bell agreement were not available at press time.

Under the proposed BellSouth agreement, some 65,000 CWA workers in nine Southeastern states would receive an immediate raise of 2%, followed by 1.5% increases on the first and second anniversaries of the three-year pact, and annual cash payments based on the company's service and earnings performance. The agreement also calls for employees to be retrained to keep layoffs to a minimum. To that end, the contract essee **CWA** page 7

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Net management systems can help pare downtime costs by identifying points where problems occur. **Page 28.** 

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► NETWORK UPGRADE

# AT&T wins \$66m FAA air traffic net revamp pact

Will install new systems at 2,000 sites.

**BY MARY PETROSKY** 

West Coast Correspondent

WASHINGTON, D.C. — AT&T last week won a \$66 million contract with the Federal Aviation Administration (FAA) to develop and install a new voice and signaling network to control communications between air traffic controllers and pilots.

The contract calls for AT&T's Federal Systems Division, based in Greensboro, N.C., to design, develop, test and manufacture radio control equipment (RCE) to be used in the FAA's \$10 billion National Airspace Systems Plan upgrade of the nation's air traffic control system.

AT&T beat out contract competitors SCI Systems, Inc. and Litton Amecom. The value of AT&T's contract could climb to \$120 million if certain options are exercised.

The RCE network will be installed during the next six years at 2,035 locations nationwide. Design is expected to take approximately 18 months and testing another six, with first implementation scheduled for late 1988 or early 1989, according to Ray Chapman, AT&T RCE project manager.

The current communications

system for air traffic control consists of links between air traffic control sites, which are responsible for a given block of airspace and may include several airports, and remotely located radio equipment, Chapman said. The remote radio equipment is used to extend the range of radio contact between pilots and air traffic controllers over a larger geographical region.

AT&T's

contract could

climb to \$120

million. ??

Currently, leased and private lines connect the control sites with the remote radio equipment ("Disaster deliverance," *Network World*, Jan. 27).

The RCE, which AT&T will upgrade, is responsible for getting voice and data signals on and off

the leased lines. The RCE sits between the control site's voiceswitching equipment and the leased or private line at one end and the line and radio equipment at the other end.

AT&T has been contracted to provide new RCE that will combine voice signals from conversations between the air traffic controllers and pilots with digital control and diagnostic signals for the radio equipment, Chapman said. The current air traffic control system uses above-band signaling, which means control and diagnostic data are carried in analog form at frequencies above the voice traffic.

Because weather conditions can affect higher frequencies, this method of transmission is not as reliable as the in-band method AT&T will be using, Chapman said. AT&T plans to transmit data in digital form within the middle of the voice channel, he added.

RCE advantage

One of the advantages of going with the new RCE is that the digital signal will allow the traffic controllers to reconfigure the remote radio equipment, as well as control, maintain and monitor it.

Since the RCE is responsible for extracting and inserting data into the voice channel, "This is a critical part of the system and needs to be very reliable," Chapman said. In addition to greater reliability, the new RCE will give the FAA the flexibility to use lower grade leased circuits, which are more economical, Chapman said.  $\square$ 

### ► COMPUTER INQUIRY III

### **Users: 'Hands off net information'**

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — User and vendor opinions of how to fine-tune the Federal Communications Commission's recent Third Computer Inquiry ruling differed across the board, but all involved agreed that customer network information is sacrosanct and should be rigidly protected.

Users want to ensure carriers do not disclose proprietary information about their networks to other service providers without users' consent. The disclosure of information about the public network as well as private customer networks is just one issue under consideration in the FCC's Computer III supplemental notice.

In the first phase of Computer III, the FCC eliminated structural separation requirements for AT&T and the former Bell operating companies and established safeguards designed to prevent these dominant telephone companies from taking unfair advantage of their market positions.

The Computer 3.5 proceeding, as the second phase of this inquiry is sometimes called, is designed to tune those safeguards in areas of protocol processing, open network architecture, comparably efficient interconnection (CEI) and network channel terminating equipment. The FCC will also decide whether protocol processing and network channel terminating equipment should be classified as basic or enhanced services.

CEI is designed to ensure that nondominant firms receive the same quality of transmission service from AT&T and the BOCs that the companies inherited from the old Bell System. Open network architecture is a plan to make information about the public network available to all vendors of network services.

In the protocol processing category, the FCC posed three possible options. Alternative A would remove protocol processing from the enhanced service domain and place it within the basic service category, subject to regulation. Alternative B would treat protocol processing as an enhanced, nonregulated service as long as the data being transmitted was not altered. Alternative C would retain the basic and enhanced service categories now used in the Second Computer Inquiry guidelines.

In its suggested Computer III refinements, the Association of Data Communications Users (ADCU)

supported Alternative A, saying it would provide users with the greatest number of service options. ADCU also said dominant carriers should be allowed to sell network channel terminating equipment and multiplexers (a type of network channel terminating equipment) on a tariffed basis.

The International Communications Association supported Alternative C in its suggested rule revisions, saying it would provide the greatest benefit to users and would be the least confusing to implement. In addition, "ICA favors measures to ensure that carriers provide nondiscriminatory access to network services and disclose network information to competing enhanced service providers."

IBM favored Alternative C in its filing, saying protocol conversion as well as network channel terminating equipment should be offered on a competitive, nonregulated basis. "The marketplace for each of those offerings is highly competitive and should remain nonregulated to permit the marketplace to generate the greatest number of alternatives to fulfill users' needs."

The BOCs generally supported Alternative A as the most conducive to the creation of new services and fostering of competition.

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"ABC membership applied for"



**ABP** 

### ► ACCESS CHARGES

# Carriers, users ask FCC to naysay Nynex tariff

**BY JOHN DIX** 

Senior Editor

The largest long-distance carriers and several public service officials last week asked the Federal Communications Commission to reject a proposed Nynex Corp. tariff that would charge customers for access to long-distance carriers, instead of charging the carriers directly.

Among those who have asked the FCC to reject the proposal were MCI Telecommunications Corp., AT&T, US Sprint Communications Co., New York Attorney General Robert Abrams and the New York State Department of Public Service, according to MCI.

This filing is one of several Nynex tariffs that have surfaced in the last few months meant to encourage users to retain Nynex's switched services.

Each filing is intended to lower service costs for large users — by increasing residential rates in one case — in an effort to dissuade corporations from exploring bypass options ("NY Tel seeks to stem bypass tide," Network World, July 14).

Star from page 2

Star Switch will consist of the same switch components and will be expandable in 320-port increments, just like the DSM Series 2001.

Although AT&T was anxious to announce the switch to respond to a similar OEM switch deal that IBM reached with Bytex Corp. last year, AT&T "did not want to make a commitment to a product until it was sure the product would get to market," according to Jeff Kaplan. Kaplan is a senior communications analyst with International Data Corp., a Framingham, Mass.-based research outfit. He said the delay actually worked to AT&T's advantage. "It gave the company the opportunity to wait and see what happened with IBM.

One of the things AT&T may have learned in the interim is the need for a single network management system to support a range of data communications products. According to the AT&T insider, the Star Switch will be integrated with the Dataphone II Level IV controller. The Level IV controller. The Level IV controller is an AT&T 3B2 supermicrocomputer that is currently used to control AT&T's T-1 multiplexer and line of digital service units (devices that terminate digital lines) and analog private-line modems.

While appealing, integration may not compensate AT&T for the fact that IBM and other vendors are more at home and welcome in the computer rooms that typically house matrix switches.

Star Switch is slated to be available in January 1987.

The latest outcry concerns a tariff that is officially registered with the FCC as the End User Originating Access Service (EUOAS). It is also known as the Revised Access Tariff and Access Restructure Tariff, according to Robert Jackson, director of public policy for MCI's northeast division.

The tariff would shift access charges from carriers to end users in a multifaceted restructuring that would reduce large customers' bills and up those of smaller customers.

The groups are opposing EUOAS on two fronts. Public service agencies say the tariff would unjustifiably raise rates for smaller users. And, in addition to the rate complaint, long-distance carriers claim the tariff will create billing nightmares.

Jackson maintains that EUOAS would grossly complicate billing by splitting the charge for a single call into long-distance and access components.

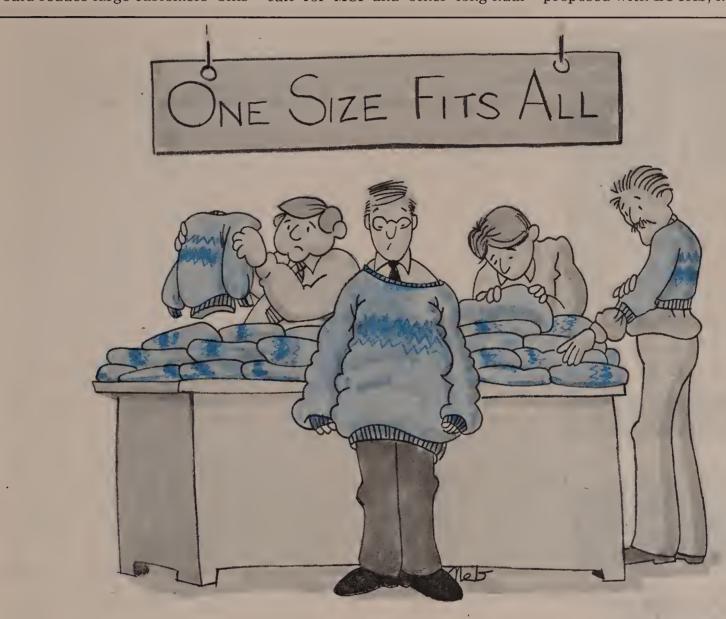
Because the companies use different billing cycles, it could be possible to get a bill for a single call in two different envelopes and possibly two different months, Jackson said. This would make it difficult for MCI and other long-haul

carriers to resolve customer billing problems.

George Leach, division manager of Nynex's Federal Regulatory group, said the tariff would raise rates for residential customers a maximum of 19 cents per month in New England and 43 cents per month in New York.

The access charge shift, he maintained, is needed to create an incentive to keep large businesses on the switched network. Corporate traffic subsidizes smaller users, Leach said.

Without EUOAS-like incentives, these companies may bypass the switched network, a development that would increase the end user's bill three or four times more than proposed with EUOAS, he said. Z



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### ► LOCAL NETS

### General Computer debuts server tool

Allows Macintosh users to share files, memory over Appletalk.

BY MICHAEL FAHEY

Staff Writer

CAMBRIDGE, Mass. — General Computer Co. last week introduced file server software that lets as many as 32 Apple Computer, Inc. Macintosh users share hard disk storage capacity, files and programs across Apple's Appletalk local-area network.

Announced in conjunction with the Macworld Exposition held in

Boston, Hypernet includes a host program that is installed on a Macintosh equipped with one of General Computer's Hyperdrive internal hard disk drives. Users can make unlimited copies of a so-called client program for other Macintosh computers on the network.

Hypernet allows users to work directly with remote files and programs or move copies to their own machines. When several users are updating the same remote file, the product has a file-locking capability that allows only one person to write new data to the files. Locked-out users may view the contents of the file. Hypernet displays the contents of remote hard disks on the network as a series of standard Macintosh icons. Users may work with files on different processors and disk storage can be dynamically allocated among net users.

Hypernet costs \$299. Hyperdrive 2000 costs \$2,999. **Z** 

### ► SUPERCOMPUTING

### Superserver unveiled

**BY JIM BROWN** 

New Products Editor

BEAVERTON, Ore. — Floating Point Systems, Inc. (FPS) last week unveiled two new minisupercomputers, including what the company dubbed its Superserver 64-bit network server that allows Ethernet-connected workstations to share supercomputer power.

The basic M64/220 Superserver model offers 6M floating-point operations per second (Flops) of power, upgradable to a M64/230 model with 12M Flops. Both models boast a dual processor architecture, 8M bytes to 32M bytes of main memory and FPS's System Job Executive (SJE) operating system.

The Superserver, priced at between \$148,000 and \$236,000, attaches to a Sun Microsystems, Inc.'s 3/50 workstation connected to an Ethernet. The server is compatible

with the Transmission Control Protocol/Internet Protocol (TCP/IP) and Sun's Network File System. The Sun workstation transmits files received from other workstations at up to 96M bit/sec to the Superserver's Motorola, Inc. 68020 control microprocessor over a Small Computer Systems Interface.

The control processor executes SJE functions to compile batch files that are passed at up to 384M bit/sec to a FPS microprocessor that performs the actual floating point and integer computations.

The firm also announced its Superstation minisupercomputer, which is similar in architecture to the Superserver. The 6M-Flops M64/320 and 12M-Flops M64/330 Superstations are priced between \$187,000 and \$275,000 and are designed to attach to a single user Digital Equipment Corp. high-end microcomputer. \(\mathbb{Z}\)

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### Washington update

BY KARYL SCOTT

Washington, D.C. Correspondent

The U.S. Senate Subcommittee on Patents, Copyrights and Trademarks approved the electronic communication privacy bill (S-2575) last week and was expected to send the bill on to its parent, the Judiciary Committee, for consideration. If passed, the legislation will go before the full Senate, where it is expected to be discussed in September. The U.S. House of Representatives passed identical legislation (H.R. 4952) in June. The bill, an update of the 1960s wiretap law, addresses new technologies such as electronic mail, cellular telephones and data transmission networks. It would protect such communications against unlawful tampering or interception. The bill also establishes clear guidelines for law enforcement officials seeking access

to electronic communications in during criminal investigations.

■ U.S. House and Senate conferees working to draft new tax legislation are considering a proposal that would give the telephone industry a slight tax advantage over other utility groups. A proposal set forth by Sen. Robert Packwood (R-Ore.), chairman of the Senate Finance Committee, would give telephone companies faster depreciation rates on physical plant than other utilities are given. Other utilities would be subject to slower depreciation rates under a plan to raise corporate tax revenue.

■ The U.S. Air Force has awarded four contracts to potential suppliers of expendable satellite launch vehicles (ELV) as part of an effort to spur the development of a new means of putting satellites in space.

See **Update** page 8

FCC

# Return rate impact still unclear

**BY KARYL SCOTT** 

Washington, D.C. Correspondent

WASHINGTON, D.C. — While AT&T and local exchange carriers have denounced the Federal Communications Commission's recent decision to lower the rate of return they will earn for providing interstate telephone service in the next two years, it is unclear whether the change will lead to significantly lower rates for users.

The FCC lowered the rates of return for AT&T and exchange carriers to 12.2% and 12.0%, respectively, from 12.75% (see "Agency cuts carriers' rates of return," *Network World*, August 11). The FCC said the new rates could result in interstate service rate cuts totaling \$1.2 billion in 1987 and 1988. But analysts say users may never enjoy those rate decreases because of a variety of factors that could affect telephone company performance.

Among the factors that could impact telephone company profits and the level of rate reductions in the coming two-year period is the possible repeal of the investment tax credit, a move now under consideration in Congress. If the credit is withdrawn, the companies' tax burden could be increased. Access charges also will have an effect on AT&T's profits and rates. If the rates continue to decline, as currently expected, AT&T will be able to pass that saving on to consumers. If they go up, users will probably not see any rate de-

New labor agreements reached with the Communications Workers of America and the International Brotherhood of Electrical Workers also could weaken profits and dilute the service rate decreases envisioned by the FCC.

What is clear in the wake of the FCC's action is the telephone industry's across-the-board opposition to the ruling. AT&T is opposed to the new rate of return, because it believes the FCC underestimated the increased risk AT&T faces in the now-competitive long-distance business, according to spokeswoman Edith Herman. AT&T's rivals aren't happy with the FCC decision either, because the lower rate of return may enable AT&T to offer services at rates lower than them.

Exchange carriers, such as the Bell operating companies, last week also expressed their displeasure with the ruling. Representatives of the firms said the FCC's decision is likely to discourage investment in telephone companies. "The rate is too low," said Philip Campbell, president of Bell Atlantic Network Services, Inc. "The FCC must encourage telephone companies to earn like other businesses." 2

### ► TRANSMISSION ALTERNATIVES

### Retail chain opts for Vsat network

**BY BOB WALLACE** 

Senior Writer

LEBANON, N.H. — Burlington Coat Factory Warehouse Corp. last week inked a pact for a very small aperture terminal satellite network that will save the company between \$800 and \$1,000 a day in data communications costs.

The network, an Equatorial Communications Co. Equastar Satellite Transaction Network, will connect roughly 85 Burlington Coat Factory retail outlets scattered across 31 states to the company's data processing center here.

The Vsat network will be used by the outlets primarily to pass local purchase order updates to Burlington Coat's customized front-end processor and to three Honeywell, Inc. mainframes at its DP center.

The geographically dispersed Vsats will be used to submit batch transaction files to the company's DP center after normal business hours. To a lesser extent, the satellite net will be used to handle credit card authorization transactions.

Mike Prince, DP manager for Burlington Coat Factory, said the company would realize the cost savings by eliminating the need for local lines connecting outlets to Tymnet's public data network. That net handles the flow of credit card authorization transactions. The message unit fee each site is charged for each credit card authorization call will also be eliminated.

The company has already negotiated a more favorable rate for paying Visa, Mastercard, American Express and Discover for each credit-card authorization because the Vsat network promises to speed such transactions.

Prince said using the Vsat network would allow Burlington Coat Factory to trim nearly half a minute off the time currently required to complete a single credit-card authorization. The company has conducted performance tests with the 10 retail sites already on-line.

"We clocked the amount of time required for a credit card authorization to be completed at 12 sec-

CWA from page 2

tablishes the BellSouth Career Continuation Program, which will be administered by company and union officials.

BellSouth and the CWA also agreed to offer substance abuse programs, widen the scope of medical plans, and enact measures to contain health care costs.

The Pacific Telesis agreement calls for no layoffs and 2% increases each year of the three-year contract, with an additional .5% for workers in metropolitan areas in Years 2 and 3, and an annual cash payment based on the company's performance.

CWA members must now vote to ratify the tentative contract agreements. **Z** 

onds," Prince said. "This represents a dramatic improvement. Before the Vsat network, these transactions took 40 seconds to complete."

Prince said the company examined the feasibility of constructing a leased-line network to handle its various point-of-sale applications, but he concluded that such a network would be difficult to implement and manage. "We were not excited about the possibility of having to order leased lines several times over. We wanted a single ven-

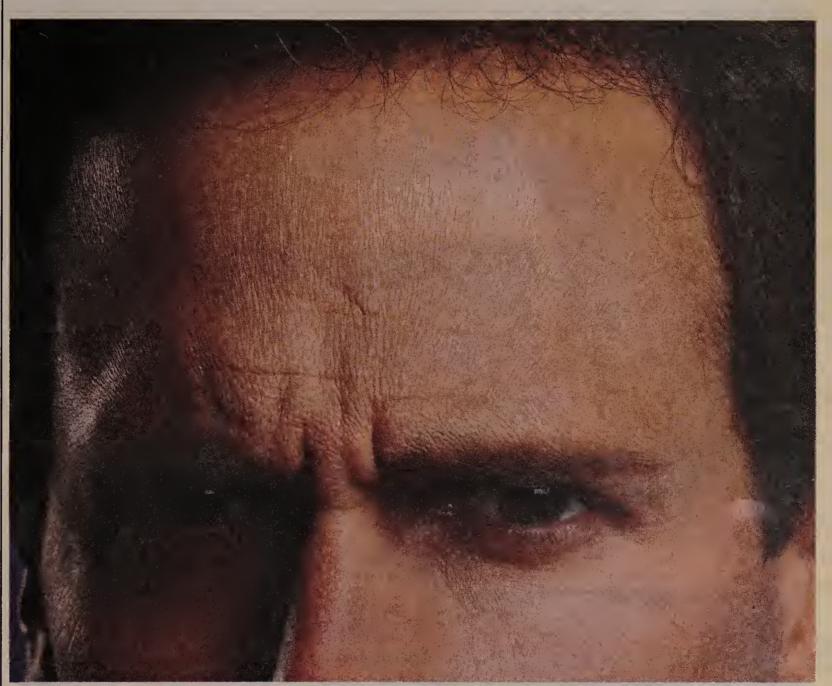
dor solution — one-stop communications shopping.

"The primary logistical problem we foresaw was installing individual Vsats in a timely fashion because of the difficulty of tracking down the various building landlords for permission to mount the antennas on the roofs," he explained. The company will pay Equatorial a flat Vsat installation fee, entrusting the entire installation operation to the carrier, including dealings with building owners and the handling of local

zoning ordinances.

Once completed, stores in the network will use their rooftop dish antennas to relay packetized data in an X.25 format off a satellite to Equatorial's shared master earth station in Mountain View, Calif. The network can handle data transmission at speeds up to 1,200 bit/sec from each remote Vsat, while the hub will transmit data to remote Vsats at 19.2K bit/sec.

The data at the hub station will be channeled through a front-end processor to a Codex Corp. 2660 modem, which will send the information over a cross-country leased line at 16.8K bit/sec. A complementary hardware set will funnel the data to the company's Honeywell mainframe at the DP center. 72



# "I want to know why the network is down. And I want to know now!"



Is it the mainframe in Atlanta? The switch in London? A communications breakdown? Or an overseas line failure?

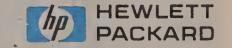
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MC15504

### Software from page 1

come from the company's largest customers. Lotus will provide networking functions for its spreadsheet programs in a separate add-in program, code-named Networker, slated for release in the first quarter of 1987.

Beginning immediately, users with an IBM 370 series mainframe will be able to download 1-2-3 and Symphony from the mainframe to personal computers equipped with 3270 terminal emulation and hard disk drives. Personal computers can be connected directly to the mainframe or linked through dialup telephone lines.

Although Lotus admits that, at present, only its very largest customers are likely to see a need for

1985, Network Control Corporation

the electronic distribution capability, the company plans to make it possible to distribute its entire product line in this manner, said Marty Fahey, manager of sales planning.

Using a corporate mainframe to distribute microcomputer software has long been a topic of discussion within the computer industry, said Bill Weil, technical services director at Ferrin Corp., a San Francisco-based consulting firm. "Users have been asking for a way to simplify distribution of software for years," Weil said.

Benefits of downloading software from a mainframe include centralized control of a program and greater convenience in distribution of updates, as well as in sending copies to new users.

Although Fahey believes fewer than 20 Lotus customers this year will sign up for the mainframe distribution program, he said these customers have between 500 and 40,000 copies of 1-2-3.

Under the current implementation, users can only download 1-2-3 to hard disk drives; once installed on a hard disk drive, the program cannot be copied. Lotus will be offering the capability to download to floppy disk drives, but Fahey did not say when it would be available.

Likewise, users have been asking for network capabilities from Lotus for some time, according to Mike Orsak, senior research analyst for Input, Inc., a market research firm based in Mountain View, Calif. A survey conducted last year among microcomputer support staffers as well as users indicated strong demand for a networked version of 1-2-3. Orsak said.

Before release of their most recent versions, both 1-2-3 and Symphony were reworked to make them "network ready," said Robert Perry, Lotus' marketing manager for network products. Lotus chose to implement networking capabilities through add-in programs, rather than in new versions, to protect users' current software investment, Perry said. The Networker will provide such functions as file locking and a counter mechanism for controlling the number of concurrent users of the program, he said. The Networker will support Microsoft Corp.'s MS-DOS 3.1, he added.

"Generally, only one person uses a spreadsheet at one time," Perry said. As a result, 1-2-3 now lets users load spreadsheets into memory, which leads the operating system to believe the file is closed. In a network environment, this would allow more than one user to access the same file at the same time.

With the Networker, Lotus will likely provide file locking by default for any network spreadsheet file that a user opens. Templates may be handled differently, however, since these files should not be locked. "We're still determining a lot of the functionality of how to retrieve files," Perry said.

Locking files is a "real tricky" problem for 1-2-3, Ferrin Corp.'s Weil said. "Whatever scheme they come up with, it's probably going to change the way people handle files," he added.

Other facets of the 10-point Multivalue Plan announced by Lotus include the Extended Value Program. This program allows companies that have upgraded in volume to the most current releases of 1-2-3 and Symphony to remove the copy protection from these applications.  $\mbox{\em Z}$ 

### Update from page 6

The Air Force has asked the four companies to study the feasibility of using medium launch vehcles (MLV) in place of the space shuttles to launch satellites. One of the four, Hughes Aircraft Co., said its contract involves not only research but the design and construction of ELVs for military and commerical use. Hughes is working with Boeing Aerospace Co. on the six-month study phase of the contract.

■ U.S. District Court Judge Harold Greene has approved line-of-business waivers allowing US West to move into foreign manufacturing and the sale of office products. Similar waivers were granted to Nynex Corp. earlier this year.

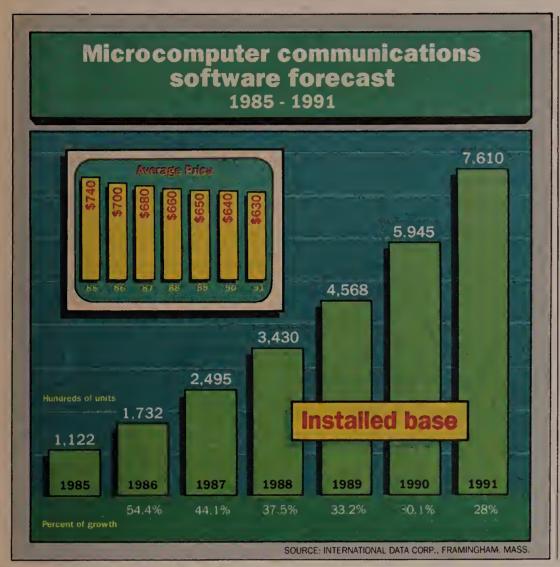
■ Sen. John Danforth (R-Mo.) has agreed to move Sen. Robert Dole's (R-Kan.) legislation through subcommittee and committee hearings in September. Danforth said he agreed with the intent of the legislation, which would transfer authority over the AT&T and GTE Corp. consent decrees to the Federal Communications Commission. Z





66 Marketing efforts in the area of ISDN have been seriously misdirected. While most efforts have been aimed at offering new performance features for communications networks and modest cost-savings, the real potential of ISDN lies elsewhere. The principal advantage of ISDN is similar to that of other techniques for integrating DP and communications. Namely, standardization reduces the cost of software development because applications can be transported to other locations that conform to the standards. Modules developed for a given application can be applied to others. Software product lifetimes may be longer due to the preservation of standards over time.

"The Next Stage for ISDN: Determinants of Corporate Growth" a study by Venture Development Corp., Natick, Mass.



► INDUSTRY MOVES

### NET swallows Comdesign

Aims for 'complete network solution.'

BY MICHAEL FAHEY

Staff Writer

REDWOOD CITY, Calif. — Network Equipment Technologies Co. (NET), a rising star in the emerging T-1 multiplexer market, moved to broaden its product line last week by agreeing to acquire Comdesign, Inc., a maker of low-speed multiplexers and wide-area network products.

According to officials of the two companies, the merger will be completed by the end of August. A Comdesign official said company shareholders will receive NET stock in exchange for their Comde-

sign shares. No further details of the merger terms were released by the two privately held companies.

NET, a start-up fueled by \$25 million in venture capital, primarily manufactures T-1 transmission equipment that allows voice, data and video to be sent at speeds of 1.54M bit/sec. Comdesign, which will remain headquartered in Santa Barbara, Calif., makes statistical multiplexers, mid-range wide-area network processors, X.25 products and data switches primarily for the 64K bit/sec data communications

NET's T-1 market rival, Cohe-See **Merge** page 10

### CONTRACTS

CANON CITY, Colo. — Mountain Bell will test an Ericsson Network Systems AXE digital switching system in its first central office application in the U.S. beginning October 1987.

BOULDER, Colo. — Republic Telcom Systems Corp. has received \$7.25 million in first-round investment commitments to market its RLX Private Line Expanders low-bit-rate packetized voice multiplexers. Lead investors are Edelson Technology Partners and Dougery Jones & Wilder. The corporate investor is Republic Telcom Corp.

MT. LAUREL, N.J. — Avant-Garde Computing, Inc. has signed contracts totaling \$2 million with Nynex Corp., Ford Germany and Metropolitan Life for Net/Guard and Net/Alert network monitoring systems.

BOXBOROUGH, Mass. — Micom-Interlan, Inc. won a contract valued at \$1.5 million to supply Ethernet controllers as part of a \$150 million nationwide exchange enhancement project for British Telecom. Micom-Interlan will supply STC Telecoms Ltd. of London with more than 2,500 NI3010A multibus-compatible Ethernet controller boards to support a dual Ethernet network in 228 British Telecom exchanges nationwide.

### **VENDOR VIEW**

MARK DAVIES

### Mergers spur net integration concerns

his is the decade of the merger, as evidenced by the commercial banking industry. At the beginning of 1985, there were nearly 15,000 commercial banks in this country. By 1995, this number is projected to be less than 5,000.

As the race to consolidate assets heats up, the remaining industry participants face the monumental problem of integrating and managing the communications networks that have become the backbone of their businesses. The prophesied heterogeneous network of the future — a blend of vendors and technologies — is rapidly becoming the status quo.

Maintaining network availability is the critical task in this emerging environment. Due to market fluctuations in buying and selling money, the financial services industry is particularly vulnerable. When a network is unavailable, losses can add up to millions of dollars.

The data communications industry has responded to this en-

Davies is vice-president of wide-area networking at Codex Corp. in Mansfield, Mass.

vironment by offering increasingly sophisticated network management and performance measurement systems. However, no vendor has a network management solution on the market today that fully addresses the management requirements inherent in the environment.

This is reflected best in the market statistics themselves. When compared with the industry as a whole, network management systems represent a relatively small segment of the communications market, with 1984 sales less than \$50 million, according to International Data Corp. in Framingham, Mass.

Nevertheless, network management is becoming the most critical aspect of any corporate network.

As the market evolves to a heterogeneous network management solution, the key is integration. The network management system must have the capability not only to access but to integrate information from a variety of products. The basic functions themselves — event, fault, performance and configuration management — must also be integrated.

. Problem detection and service restoral will continue to be the primary concerns for the network operator. Event management tools are needed that can detect problems in the network, allowing the network management system to make adjustments automatically to maintain availability. A sophisticated fault management function can then step in to diagnose and isolate the problem and subsequently restore service.

Performance management will be a major factor for network planners. This function is essential in managing network capacity and ensuring that quality of service levels are maintained — whether the network is a major revenue generator or is necessary to the internal operation of the business. Network availability, reliability, throughput and efficiency are long-term concerns that should be addressed by performance management.

Integrated control will be a critical element; end-to-end configuration management must be provided. The system must have the ability to coordinate configurations across multiple devices

. See Integration page 10

Merge from page 9

sive Network Corp., was swallowed up by Atlanta-based Digital Communications Associates, Inc. (DCA) last month ("DCA widens its piece of the T-1 pie," Network World, July 7). DCA purchased Cohesive for \$28 million.

Industry observers said the acquisition will allow NET to offer users a comprehensive solution. "Integrating a lot of components into a comprehensive network is a big job. NET has demonstrated they can build a T-1 backbone," said Tim Zerbiec of Vertical Systems, Inc., a Dedham, Mass.-based consulting company. "Now they can go the next step and say to users, 'We will help you tie your other applications into this network."

NET and Comdesign will undertake joint development projects, primarily to produce software linking their products, according to Tony Russo, vice-president of marketing at NET. Russo said NET's sales personnel would sell any jointly produced T-1 products. Comdesign's distributors will continue to sell that company's products, Russo said.

"The key point of the merger is that it gives NET a much wider variety of products to sell," Russo said. "The biggest thing users want are products that work not just from an applications standpoint but from a network management standpoint."

Analysts said NET has earned a reputation for producing top quality products and for strong market-

"They have a good product from a technical point of view, and they really know how to market it," Zerbiec said. NET's customers include American Express Co., Inc., American Airlines, MCI Communications Corp. and IBM.

A need for slower speed products

'[NET] has developed the expertise to build huge corporate networks," said Robert Dolan, president of Comdesign. "When you build those large networks, you have a great need for slower speed products to attach to the backbone. That's where we come in." Dolan said he will continue as head of Comdesign. Z

Integration from page 9

from a single access point.

An easy-to-use operator interface that accesses network information and management tools is another key component. This element has taken on new importance as networks have become more complex. Not only is it increasingly difficult to find trained people, the network itself has become more susceptible to operator error. By providing a cohesive operator interface, the network management system can be maintained by a few competent people as opposed to numerous technicians. Training costs are reduced, as is human error.

How will an integrated network management system come into being? The answer lies in an architectural approach to development of the system. This approach encompasses not only the configuration of the network itself, but the individual devices in the network.

Until now, the only approach was an ad-hoc method requiring the development of customized software applications for each integration point in the nework. For example, in integrating five network environments, up to 25 separate and complex software applications must be written. Corporations have found this technique costly, timeconsuming and subject-to errors.

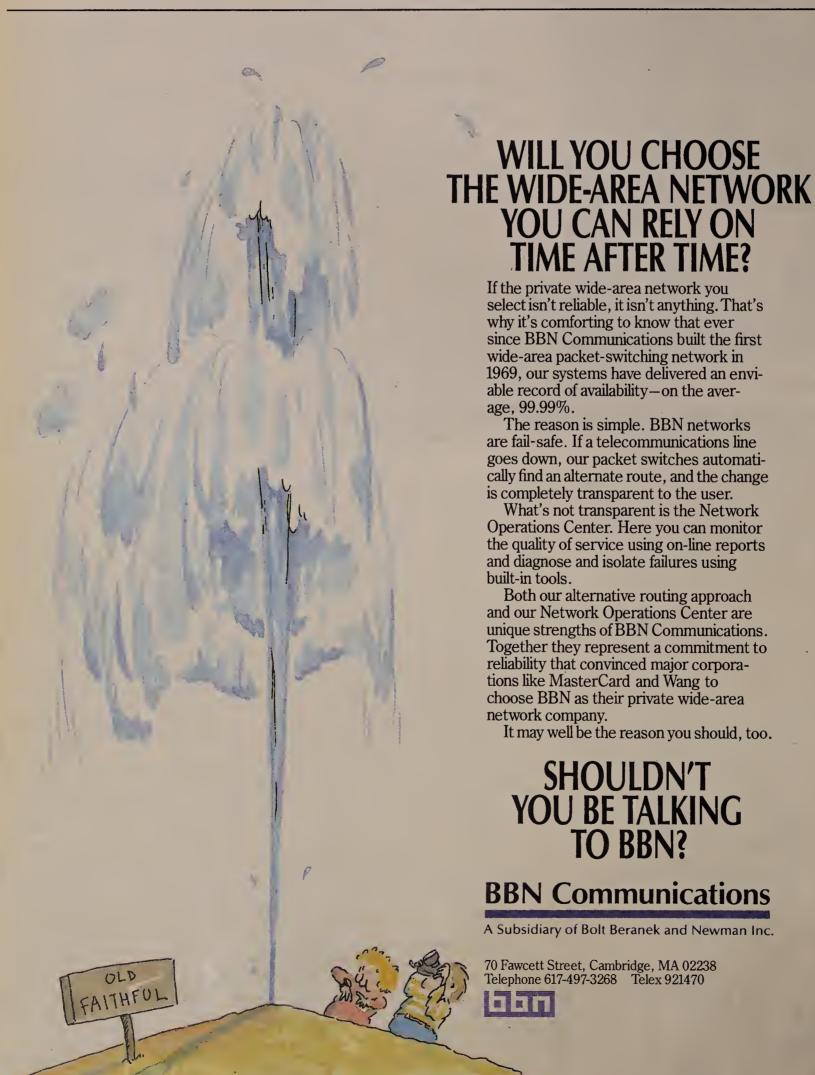
An architectural approach allows the network management system to be designed independently of the networking environment. With this method, a single point of integration is sufficient. The resulting network management system will be more flexible and costefficient, and users will be able to incorporate a variety of vendor equipment and technologies.

Transmission resource management is emerging as a subset of integrated network management to tackle an even more complex networking environment encompassing voice, data and, ultimately, video. In essence, it is a cohesive approach that optimizes all transmission resources in the network, from fractions of high-speed digital lines to dial-up modems. On higher speed links such as 56K bit/sec and T-1, this is particularly important in optimizing bandwidth shared by voice and data applications.

Artificial intelligence will also have an impact on integrating the functions of network management. Referred to as knowledge-based systems, artificial intelligence tools hold the promise of providing operators with a cross-check in configuring computer networks. In the future, users can expect to see a multitude of knowledge-based systems designed to solve tightly focused problems. Limited areas of fault diagnosis and network design will be addressed by a number of

knowledge-based tools.

This is the decade of the merger, not only for corporations and the corporate network, but for network management as well. As the functions merge into a cohesive, integrated management system, users will finally have powerful tools to transmit and manage information in this complex heterogeneous environment.





### Mountain Bell adds new Colorado area code

Mountain Bell announced recently that it will create a new area code in Colorado in 1988. Numbers available under the current 303 area code are running out. The 44 unassigned exchanges left under 303 are expected to be exhausted by the time the new area code, 719, goes into effect. The number of telephone customers in Mountain Bell's southern calling area, which will use the new area code, grew 11% in the last two years, 4% higher than growth in the northern calling area.

► NET UPGRADES

# Campus wired for voice / data

\$10m AT&T net package puts dual ports in every dorm room and office.

BY MARGIE SEMILOF

Senior Writer

BOULDER, Colo. — The University of Colorado recently cut over a 10,000-line private branch exchange and a large data switch in a \$10.6 million project that put voice and data ports in every dorm room and campus office.

The network package includes an \$8 million AT&T System 85 PBX, an Information Systems Network (ISN) data switch network that runs on a fiber-optic backbone and a facility that houses the communications staff and the new switch.

The ISN data switch was initially cut over with roughly 500 data ports but will be expanded over time. The university anticipates

supporting at least 1,000 data devices by the end of the year, including all campus computers. In addition, all dorm rooms, professors' offices and other campus facilities have been wired with twin RJ-11 jacks, one for voice and one for data. The PBX and ISN took the place of a 12-year-old Centrex system.

According to Jeff Lipton, director of office support and telecommunications services, the university required a network capable of supporting the heavy data traffic generated by its many research departments.

Approximately 10 contract bids were submitted by other PBX manufacturers and by carriers offering Centrex-like solutions. Lipton See **Cutover** page 12

Packet switching outlook:
Node and PAD unit shipments and revenue
1985 & 1990

		Units		Rev	Revenue (in millio					
	1985	1989	% CAGR*	1985	1989	% CAGR*				
<b>\</b> 9008_						-				
u.s.	2,780	8,539	25	169,982	478,200	23				
International	1,440	5,220	29	140,390	433,266	25				
TOTAL	4,220	13,759	27	310,372	911,466	24				
Soletice researchister of	lagore a idii				8+ - - - -	-				
U.S.	5,280	16,109	25	33,413	74,102	21				
International	3,490	12,415	29	13,755	43,452	29				
TOTAL	8,770	28,524	27	47,168	117,554	24				
			*Compound a	nnual growth ra	ate					

\*Compound annual growth rate

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

### SIGNAL TRANSFER EQUIPMENT

### **PacBell switch deal**

BOC's goal: Wats and CCS7 support.

CROSS TALK

BOB WALLACE

### Jumping the EPSCS ship

The cries of AT&T's Enhanced Private Switched Communications Service (EPSCS) customers who are suffering from exorbitant service access fees may be going unheard due to an AT&T strategy to move these users to newer services.

Several EPSCS users are paying anywhere from 35% to 40% of their total network bills to provide links between their locations and the Cadillac AT&T voice service.

The basic EPSCS is a voice service for large companies. It is provided over a dedicated network comprising several 1ESS analog central office switches located throughout the nation. An option called Shared EPSCS allows several users to combine their voice communications traffic that is routed over one or more of the network switches. Data can be passed across the network at typical 4.8K bit/sec dial-up speeds.

There are roughly 20 EPSCS users, and the EPSCS users group president claims the majority of these customers use the shared service.

Users such as Eastman Kodak Co., Xerox Corp. and Bethlehem Steel Corp. are shopping for networking alternatives to EPSCS because the price of network access lines is soaring. One consultant claimed that AT&T is attempting to move EPSCS users to its new Software-Defined Network (SDN) service by refusing to help large users bypass the local telephone company and by supporting only 17 network access points.

There is a strong case to be made for the argument that AT&T is making life difficult for users of Shared EPSCS.

Number of network access points. Compared with the 17 EPSCS nodes, SDN can be accessed through at least one

See **EPSCS** page 12

**BY JIM BROWN** 

New Products Editor

DALLAS — Digital Switch Corp. recently announced an agreement with Pacific Bell to install, on a test basis, signal transfer equipment that will enable the company to support incoming Wats services and billing for credit card calls. The equipment is also capable of supporting Common Channel Signaling System 7 (CCS7), which will enable the Bell operating company to support advanced services.

The Pacific Bell venture is indicative of a developing race between the BOCs and AT&T to deploy their own signaling methods. At stake is competition for Wats 800-type services, local credit card calling and turf in the future Integrated Services Digital Network environment.

Terms of the agreement call for Pacific Bell to install and operate a pair of Digital Switch's central office telephone signal transfer points that support CCS7.

The initial equipment delivered by Digital Switch, DSC Communications Corp.'s switching group, will include a DEX Signal Transfer Point (STP) model capable of processing 5,000 messages per second. This equipment will be upgraded in 1987 with DEX STP-L models capable of processing 80,000 messages per second.

Pacific Bell will pay Digital Switch \$5 million if, at the conclusion of the field test in late 1987, it decides to retain the STPs. Pacific Bell may also name Digital Switch as its STP supplier, a Pacific Bell spokeswoman said.

"AT&T has the upper hand right now because it is the only carrier with a nationally deployed common channel signaling system," explained Joaquin Gonzalez, an analyst at the Stamford, Conn.-based consulting firm, Gartner Group, Inc. AT&T employs CCS6, the predecessor to the new signaling method. "The Bell operating companies strategically hope to leapfrog AT&T by being the first to implement CCS7," Gonzalez said.

CCS7 is a packetized signaling channel used to establish calls and provide a link to data bases that control service access, as with credit card calling and incoming Wats services. CCS7 will be higher speed and more efficient than the CCS6 AT&T uses today, and the CCS7 is the basis for ISDN-type services.

A Digital Switch spokesman said the firm won the contract over AT&T, and he also said the transaction marks the first installation of a DEX STP within a BOC network.

"We went head-to-head with AT&T and were viewed by Pacific Bell as the one with superior technology." Z

Cutover from page 11

chose the AT&T system because it provided a protocol conversion feature that enabled Ascii terminals to access multiple hosts. Users in any department can access computers through dial-up lines. "We also expect many students to arrive on campus with personal computers and will want to connect to various campus computers," Lipton said.

Arthur T. Helfrich, regional manager of Telecommunications International, Inc., the Denver, Colo.based firm hired as consultant for the university project, said students can take advantage of the school's Wats services by accessing the System 85. Those services, which become cheaper with increased usage, would otherwise re-

main idle during the evening when administrative and academic personnel usage dropped.

"The phone system is a profit center," he said. "This does not mean the university will make a profit from the students. Student usage will lower the switch's perunit cost. So students will pay less for telephone service from the university than from Mountain Bell."

The university's 50-year-old cabling scheme was replaced with more than 260 miles of fiber-optic cabling that interconnects campus buildings. Each telephone station is wired for both voice and data. The university's entire cable plant had to be replaced to meet the System 85's wire requirements.

Lipton said the PBX should sup-

port the university's voice needs for at least 10 years, and the new cabling system should last for another 20 or 30 years.

The new system will be housed in a \$2 million facility that will also serve as headquarters for the university's communications staff, which has blossomed from 10 people to 30 people in three years.

"We are essentially becoming a phone company, so we have to staff accordingly," Lipton said. "We can no longer rely on other carriers for maintenance, installation or billing."

Lipton said the cutover was successful despite a handful of trouble calls from users. "You expect a few problems when you undertake a project of this magnitude," he said.

"We expect to find problems with maybe 2% or 3% of the circuits."

Helfrich lauded the university for its foresight and willingness to install an all-new communications system that would meet its communications needs for years.

"We see clients that try to reuse some old wire and equipment," he said. "Trying to mix old equipment with the new causes problems for us, for the vendor and certainly for the client."

Helfrich expects the university to have better phone service because it can schedule maintenance through the local AT&T Information Systems rather than Mountain Bell. "Mountain Bell is also busy handling communications for the entire city of Boulder," he said.

### EPSCS from page 11

AT&T switch in each of the nation's 190 local access and transport areas. Today, for example, EPSCS users with locations in Florida have to access the network through a node in Atlanta.

■ Bypass. AT&T will not help EPSCS users bypass the local telephone company to reach the EPSCS network. Ray Holzinger, telecommunications manager for Bethlehem Steel, said of the problem, "We use 500 access lines to connect 80 corporate locations to EPSCS. The cost of the access lines represents 35% to 40% of the amount we pay for the service each month." Although the use of bypass facilities could reduce this cost, it is not condoned by AT&T.

■ The future. SDN is certainly one of AT&T's future mainstream network services. EPSCS, however, has been offered since at least the late 1970s. The number of users has decreased in the past few years, as users such as General Motors Corp. have opted for other alternatives. Someone should ask AT&T when the most recent user joined the network. And, is EPSCS still actively being marketed to communications users? Answers to these two questions alone would help users predict the future of the service offering.

If AT&T is indeed attempting to migrate users from EPSCS to SDN, users of Shared EPSCS may witness skyrocketing service prices as the number of users slowly awingles. The shared version of the service operates on the premise that many large communications users can realize economies of scale by combining their traffic.

If the number of Shared EPSCS users continues to erode, it will be more difficult for AT&T financially to justify offering the service to the handful of remaining users. If this scenario becomes a reality, users of Shared EPSCS may find themselves in the same shoes as the users of AT&T's Net 1000 in late 1985. AT&T pulled the plug on Net 1000 because of lack of user interest.

There were only a few Net 1000 users aboard when the ship was scuttled. If EPSCS customers leave the service for an alternative, users left behind will have to decide, whether to abandon ship or go down with the vessel. Z





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**66** Vendors often talk about their products' architectures. Users could care less about a product architecture. What interests them are products that work and are available.

Rudolf Strobl Senior consultant Arthur D. Little Co. Cambridge, Mass.

COMMUNICATIONS SOFTWARE

# A bumpy road to success

Soft-Switch and SRC illustrate trials and tribulations of start-up firms.

BY PAUL KORZENIOWSKI

The obstacles on the road from entrepreneurial start-up to mature, successful communications company are amply illustrated by two software vendors that targeted the fledgling document interchange market.

Start-ups Soft-Switch, Inc. and Software Research Corp. (SRC) have gambled their corporate futures on providing software that translates and transfers documents created with one computer system so they can be used with another. Such software would allow a user of a Wang Laboratories, Inc. word processor to work with documents created with Digital Equipment Corp.'s All-In-One office system.

Soft-Switch, based in King of Prussia, Pa., has moved fairly smoothly toward maturity and is readying itself for a public stock offering. But SRC, located in Natick, Mass., has stumbled in bringing its document interchange software to market and is still searching for the right management mix.

In 1980, Michael D. Zisman founded Soft-Switch, and two years later, the company's product, also called Soft-Switch, was announced. Zisman claimed that more than 100 companies have since installed the product, although analysts put the number closer to 75. Reports indicate that users are generally satisfied with the product.

In addition to end-user sales, the company has forged marketing and OEM agreements with General Motors Corp.'s subsidiary, Electronic Data Systems Corp., Wang and Tandem Computers, Inc. Recently, Soft-Switch secured its fourth round of financing for nearly \$5 million. Zisman said the company is preparing for an initial public stock offering in approximately one year. Product sales have gone up 250% in the last year, and revenue was estimated at \$10 million for fiscal 1986.

Despite the impressive numbers, the company has not been trouble-free. Approximately one year ago, a former IBM executive, N. D'Arcy Roche, was hired as president.

"Mike Zisman knew he needed someone to oversee day-to-day operations at the company," noted Rudolf Strobl, senior consultant at Arthur D. Little, Inc. in Cambridge, Mass. Roche was expected to handle that function.

But a few months ago, Roche was fired. Zisman refused to comment on why Roche was fired, but observers said Roche was not a good "people person."

Soft-Switch recently named Frank L. Chisholm, former executive vice-president at Cullinet Software, Inc., to take Roche's place. The ex-Cullinet executive topped a list of a dozen candidates for Roche's position.

The new president said his chief objective is building a service team.

See **Start-ups** page 16

**COS** 

# Testing executive appointed

BY NADINE WANDZILAK

Staff Write

VIENNA, Va. — The Corporation for Open Systems (COS) earlier this month rounded out its senior management team by appointing an executive responsible for testing activities.

Ian C. Davidson was named vicepresident of technical products and services, a crucial component in COS' plan to stimulate the development of interoperable multivendor products. To reach this goal, COS is taking a two-phase approach. First, the organization is developing test suites, which are guidelines that determine how closely a product adheres to a set of specifications. COS is focusing on generic features, the first two being electronic messaging and file transfer addressing protocols.

COS recently adopted its first product specification, the X.400 Message Handling Standard. The standard defines a common interface so users can issue documents between different types of communications systems and network services. The message handling standard was developed by the National Bureau of Standards (NBS) Workshop X.400 Special Interest Group, said Karl Litzenberg, COS vice-president of information services. "It's our spec now," he said. "We are running with it."

The NBS standard gives COS "a detailed product specification that we can build a test suite on," Litzenberg said. The standard can be used to point out differences between message-handling product specifications in North America, Europe and Asia.

As part of the organization's second phase, COS will test products or, under certain conditions, contract testing out.

Davidson will supervise a staff of about 45 employees at a COS test center now in the formative stage. On Nov. 1, COS will move into new quarters that will include room for a test center, Litzenberg said. Actual testing is scheduled to start in the first or second quarter of 1987.

Davidson is now dividing his time between COS and the Manchester, England-based National Computing Centre Ltd., a private company that tests protocol conformance. He will start full-time at COS in September. Z

DATA DIALOGUE

PAUL KORZENIOWSKI

### Slaying the multiheaded dragon

BM has to feel like the gallant gladiator trying to slay a multiheaded dragon. As the computer industry has expanded to encompass other disciplines, so has the number of IBM competitors.

Adversaries are no longer limited to other hardware manufacturers. Earlier this year, Howard Anderson, founder of the Yankee Group, a Boston-based market research firm, said that IBM's most ominous future competitors may be General Motors Corp., McDonnell Douglas Corp., Boeing Co., Inc. and other Fortune 50 companies.

To a limited extent, Anderson's scenario appears to be coming true. Recently, Martin Marietta Co. teamed up with the seven regional Bell operating companies and bid for the Federal Telecommunications System (FTS) 2000 contract, valued at \$4.5 billion. Next, Boeing and AT&T threw another hat into the FTS ring.

Four and a half billion dollars

is not small change to anyone, not even Big Blue. One can be sure that the men in the blue pin-striped suits have put on their thinking caps and would like to get at least some piece of the FTS network, which, upon completion, would become one of the world's largest private networks. IBM has not yet bid on the contract and there is some doubt whether an IBM and MCI Communications Corp. bid would be strong enough to be seriously considered.

This contract points to a serious vulnerability in IBM's product line. Despite the company's aggressive posture, IBM is, at best, a second-tier telecommunications supplier. Since the telecommunications area represents one of the fastest growing segments of the information industry, IBM has to turn its vulnerability into a strength, and it must do it soon, because the communications technologies are rapidly maturing.

To nurture products from blueprint to shipment would require a long period of time. So, IBM's best avenue appears to be purchasing other companies. However, companies such as MCI may have goals other than becoming an IBM subsidiary.

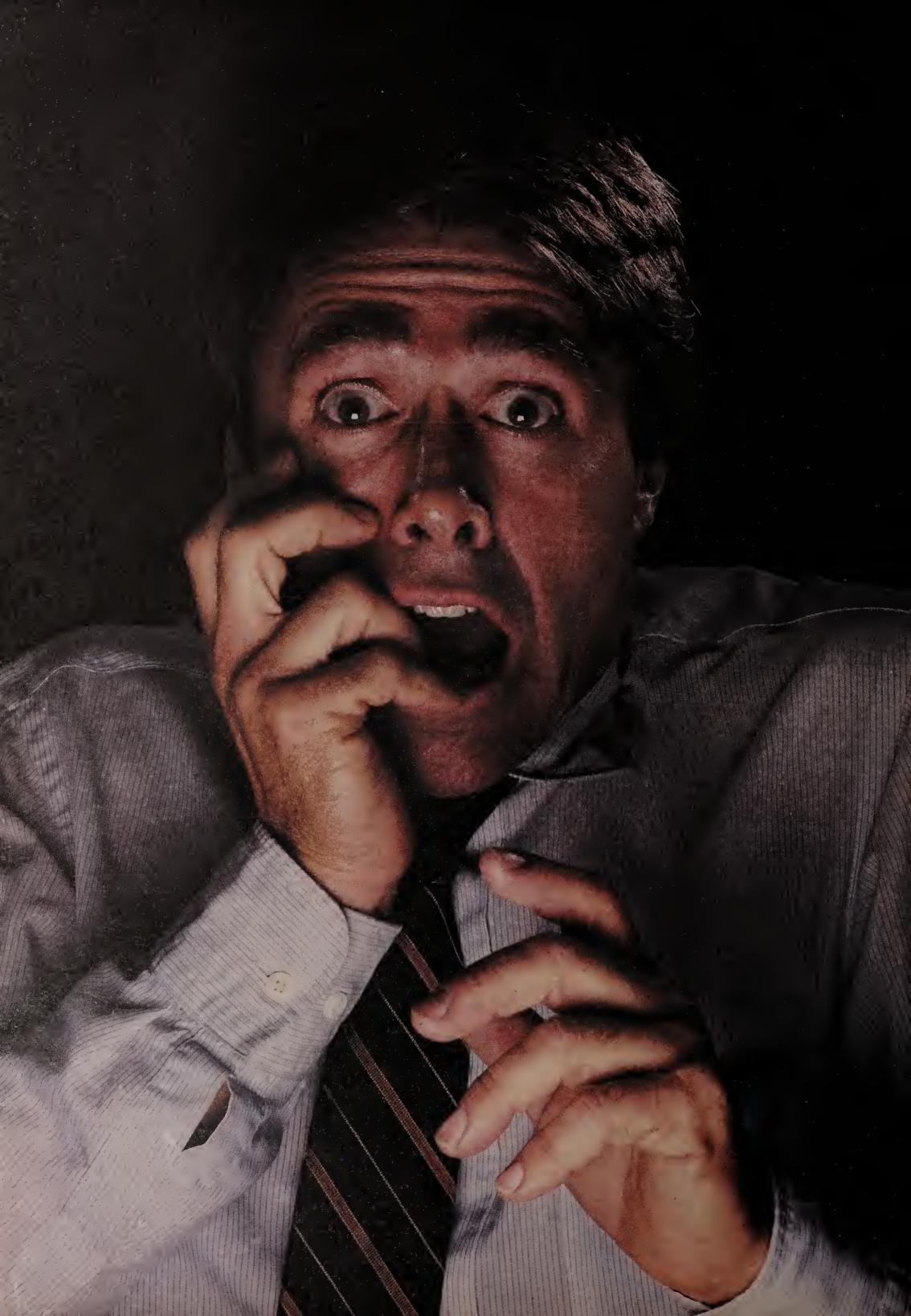
In addition to pointing out a chief IBM weakness, the emergence of these companies as suppliers illustrates another possible problem.

Traditionally, these companies represent some of IBM's largest customers. What happens if they decide to bring out their own products?

Obviously, these companies will not jump into the main-frame business. In fact, they may stay away from the hardware market altogether.

It is more likely that these companies will develop software and networking products that compete with Big Blue offerings. The purchase of Electronic Data

See Competitors page 16



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### Competitors from page 13

Systems Corp. pitted GM squarely against IBM in the software and services arena.

The automotive giant's work with factory communications makes it the company best able to understand what manufacturers need. Consequently, it may be the one best able to supply those products.

The company does not appear to have any immediate plans to use Manufacturing Automation Protocol products for anything other than automating its own plants. But the lure of selling these types of products may be too enticing to pass up.

If GM did move aggressively into IBM's backyard, the automotive

company would possess a number of competitive advantages that other companies lack.

A principal reason for IBM's domination of the computer industry has stemmed from the company's sheer size. No one would consider kicking sand in the face of someone 30 feet tall, yet the second largest computer vendor has to compete with a company that is five times its size. GM is almost twice as large as IBM, which would place Big Blue in an unusual defensive position.

Just how much of an impact this type of activity would have on IBM is questionable. For example, close to 10% of Digital Equipment Corp.'s revenue came from AT&T before divestiture.

After divestiture, AT&T announced its own computer line, and the company reportedly has been putting off purchases of DEC equipment for AT&T systems. A number of analysts predicted tough times for DEC, yet the company is the only vendor doing well during the recent downturn.

Also, Exxon Corp. plunged into the office automation business, and the project was a complete failure.

In order to compete successfully, companies would need a proper mix of technical know-how and marketing clout.

It will be interesting to see which leading edge users decide to pursue various computer markets aggressively and what impact, if any, they will have.

Start-ups from page 13

Zisman noted that OEM sales have declined from 50% of the company's revenue two years ago to approximately 18% this year. Consequently, the company has to service an ever-increasing number of end users.

Building a service team generally is one of the last functions for a start-up company. When SRC recently brought in a new company president, service was not the key issue. The primary issue was delivery delays, and President Martin Waters was hired to move the company's flagship product, Strategic Network Environment, from the drafting board to production.

In May, Waters replaced Paul Tucker, who had been hired as president and chief executive officer in 1984. In addition to the change at the top, close to half the company's work force was laid off or left of its own accord after the shake-up. The personnel changes were needed to help the company better focus its resources, according to Stefania Calabi, director of product marketing and planning.

Other management moves were made. In the last few weeks, the role of Eduardo Stecher, one of the company's co-founders, was redefined. Stecher's responsibilities as director of marketing are now being handled by Robert Steele, who formerly headed the sales and marketing efforts at Henco Software, Inc. in Waltham, Mass. Stecher is now in charge of major accounts.

Founded as a consulting firm in 1978, SRC put its hands into the venture capital tills two years ago. The company had ambitious plans for bringing a robust document and file exchange program to market.

Strategic Network Environment has proven to be a very complex piece of software, so it was divided into two components: File Transfer Facility (FTF) and Electronic Office Interchange (EOI). FTF began shipping last fall and has been used to move data from one data center to a second. SRC said that 25 companies have installed the product, though analysts put the number at closer to a dozen users. Companies currently using FTF include GE Credit Corp. and John Hancock Mutual Life Insurance Co.

The EOI component would compete directly with Soft-Switch. Although SRC has been touting its capabilities for more than a year, the software has not yet been shipped. A fall beta-test program is scheduled, and initial customer shipments are scheduled for the end of the year, according to SRC.

Both companies must still answer important questions. For Soft-Switch, the question is whether the company can continue its present momentum and make a successful transition to a public company. Zisman claimed the company is instituting a three-pronged strategic plan to ensure a positive result.

For SRC, the question is whether the company can move Strategic Network Environment from a planning to a production stage. Stecher said, "I am more optimistic about our prospects now than at any time since I joined the company."



# RACIORY MINICATIONS

### **GM** to close plant

General Motors Corp. announced it will begin a two-year program to phase out operations in its Saginaw, Mich., foundry. The automaker will begin phasing out many of the operations at its Massena, N.Y., casting plant next spring. These efforts will cause layoffs of roughly 1,000 workers.

► FACTORY LANS

### Ford's MAP local net is ready to roll

2.1-based production system to be up soon.

BY BOB WALLACE

Senior Writer

RAWSONVILLE, Mich. — Ford Motor Co. engineers here are applying the finishing touches to what may become the first production Manufacturing Automation Protocol network that complies with MAP Version 2.1. The network is expected to be fully operational by mid-September.

The MAP application involves the machining, assembly and testing of components used to construct fuel injection systems for various motor vehicles. The factory local-area network, which a technician at the plant termed a "limited production network," was designed to integrate computer equipment with automated test

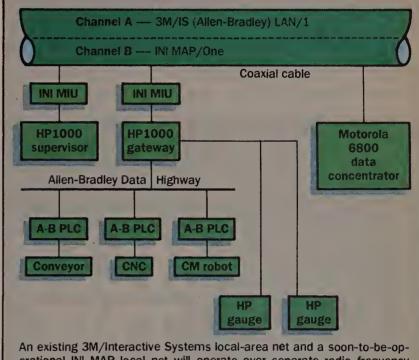
systems and programmable controllers, which are in turn linked to conveyors, robots, machining equipment and inspection

Factory gear from Hewlett-Packard Co., Industrial Networking, Inc. (INI), Motorola, Inc., Allen-Bradley Co. and Cincinnati Milacron Marketing Co. has been attached to the 10M bit/sec broadband local-area network (see graphic).

By constructing production MAP networks, Ford and General Motors Corp. have put their money where their mouths are ("GM details MAP project," Network World, May 26). Both automakers, as well as a number of users and numerous factory gear manufacturers, have announced their

See MAP page 18

### Ford's Rawsonville MAP 2.1 network



erational INI MAP local net will operate over separate radio frequency channels on a single coaxial cable.

3M/IS = 3M/Interactive Systems INI = Industrial Networking, Inc.
MIU = MAP interface unit

A-B PLC = Allen Bradley Programmable Logic Controller CNC = Computer numerical controller CM = Cincinnati Milacron

SOURCE: FORD MOTOR CO., DEARBORN, MICH.

### **FACTORY FACTS**

**BOB WALLACE** 

### Beware of worthless market research

nd the survey says . . . Locating market research that actually reflects the needs or opinions of users is about as easy as a contestant avoiding a wet kiss from Richard Dawson, host of the popular game show Family Feud.

The glaring lack of user input in market studies had become apparent to a communications hardware vendor that contacted Network World. The company was considering developing a series of products compatible with the Manufacturing Automation Protocol. The employee charged with researching the need for the specific factory products had acquired a study that purported to explain the likely future of a part of the MAP product market.

The employee claimed the study was of little use. The information used to support the its claims was suspect. The study featured no input from factory equipment users or prospective MAP product users. The employee called Network World for user contacts whose opinions would play a role in the decision of whether or not to produce MAP-compatible products.

There are three basic types of

There are three basic types of surveys or studies available to communications users and vendors. Precious few of these are based on information provided by communications equipment and service users.

■ Primer surveys. These surveys are probably the most helpful to users because they begin by tossing all of the acronyms and jargon related to a specific market segment out the window. These surveys often contain some market forecast data, but this information is tempered by a comprehensive discussion of the particular product category. Users and vendors can understand this discussion without having to scramble for a manufacturing terms glossary.

■ Future market trends. This type of survey usually forecasts the future of a particular product market by analyzing its recent developments. Future market trend surveys also detail technological developments that may act as a catalyst in the proliferation of the product. They rarely contain user input but are more informative than future sales market surveys.

■ Future sales market surveys. These surveys, as their designation implies, are focused on the future sales of a certain product, be it a factory network, a MAP modem or a personal computer. These studies go into unnecessary detail in their descriptions of how many units of the product will be sold for the current year and for each of the next five years. These studies are almost exclusively based on sales projections given to the survey developer by vendors. Therefore, they almost always paint deceptively rosy pictures of the futures of the products discussed.

If you were the marketing and sales vice-president of a modem maker, would you tell a market researcher that sales of your modem would drop at any time over the next five years?

These studies are of very little use to users because they do not explain product industry trends, features to be incorporated in the products or how current users rate the performance of the product.

The chances of the predictions made by these studies proving accurate are small.

### **INCIDENTALS**

US West, Inc. of Englewood, Colo., recently dedicated a multimillion-dollar warehouse equipped with an automated storage and retrieval system. The 170,000-foot site is the home of US West Material Resources, Inc., a new company that provides procurement, material management, transportation and reclamation services under contracts to such US West companies as Pacific Northwest Bell.

The new facility will consolidate three manually operated material warehouses. The plant will house all telecommunications, outside plant, paper products and central office circuit packs for Pacific Northwest Bell in both Washington and Oregon.

Use of the automated materials handling system will reduce reliance on such manually operated equipment as forklifts by as much as 40%. Because the new warehouse uses an automated materials handling system, the plant will be roughly 30,000 square feet smaller than conventional warehouses.

The Yankee Group, a Bostonbased market research and consulting firm, recently announced a study that examines the use of data base management systems in the manufacturing world. Those interested in acquiring a copy of the study should contact The Yankee Group at (617) 542-0100.

See Incidentals page 18

MAP from page 17

support of MAP. Many of these users are experimenting with the factory communications specification and have established MAP pilot networks in an effort to acquire a working knowledge of MAP.

Bob Yee, principal applications engineer at Ford, said the Rawson-ville plant currently features a 3M/Interactive Systems' LAN/1 broadband local-area network that serves the factory floor as well as the plant's administrative offices and its computer facility. 3M's LAN/1 is now property of Allen-Bradley, which purchased 3M's Interactive Systems division.

Once the project is completed, the MAP local net provided by INI, MAP/One, and the 3M/Interactive Systems net will operate on different channels of a single coaxial cable, Yee explained.

Network users will be able to access data collected over the MAP net by the HP1000 supervisor processor by logging into the 3M broadband local-area network with Ascii terminals. Software resident on the HP1000 supervisor will enable users to access factory floor data over the MAP network for such applications as statistical process control, production reporting, monitoring production equipment alarms and tracking machine tool usage to plan for tool maintenance.

"We were faced with engineering a communications solution if we didn't opt for MAP. If we had to write a custom communications

protocol driver for both our Hewlett-Packard and Motorola machines, there would be associated costs that would not be insignificant," Yee explained.

The data gleaned from this first MAP project will be generic, Yee said. "We will be able to apply this information to similar efforts in other Ford divisions."

In designing and constructing the MAP network, Ford hired American Cimflex Corp., a Pittsburgh-based systems integrator. Ford owns an equity interest in the company. The firm provided technical expertise to aid the Ford plant and manufacturing engineers involved in the project.

One of the two HP1000 minicomputers connected to the MAP net

houses a central data base maintaining information about the operation of manufacturing equipment tied to the net. This information is used to create reports on machine performance. Both HP1000s are hard-wired to INI MAP Interface Units (MIU), which are in turn hard-wired to the MAP network.

The second HP1000 serves as a gateway through which Allen-Bradley programmable logic controllers (PLC) transmit data to the MAP net. The PLCs are connected to an Allen-Bradley Data Highway, a proprietary local-area network that operates at 57K bit/sec. The programmable controllers, which control the operation of shop floor equipment, are hard-wired to several Cincinnati Milacron robots and other computer numerical controllers and conveyor belt machinery.

The Motorola 6800 microcomputer, which serves as a data collector, is hard-wired directly to the MAP net. The micro houses a Motorola 370 interface board, which supports this connection.

Incidentals from page 17

The Society of Manufacturing Engineers (SME) and the Machine Vision Association of SME are cosponsoring a hands-on workshop entitled "Applying Machine Vision to the Manufacturing Process."

The three-day seminar will be held Sept. 9 through 11 at the Regency Hotel in Denver. The workshop will also be offered Sept. 15 through 17 at the Hyatt Palo Alto in Palo Alto, Calif.

The workshop instructors will be Perry West, president of Automated Vision Systems in Campbell, Calif., and Steve Montellese, executive vice-president of Visual Understanding Systems, Inc. in Pittsburgh.

For additional information on the two workshops, contact SME at (313) 271-1500, ext. 399 before 4:30 p.m. To register for either seminar, contact SME at (313) 271-0039.

Factory networkers may want to attend a series of American National Standards Institute meetings to be held later this month. The Ansi X3S3.3 and X3S3.7 groups will meet on Aug. 18 in Boulder, Colo. Lyman Chapin and Catherine Dally, who chair the committee, will

speak at the meeting.

For more information on the meeting, contact Lyman Chapin at

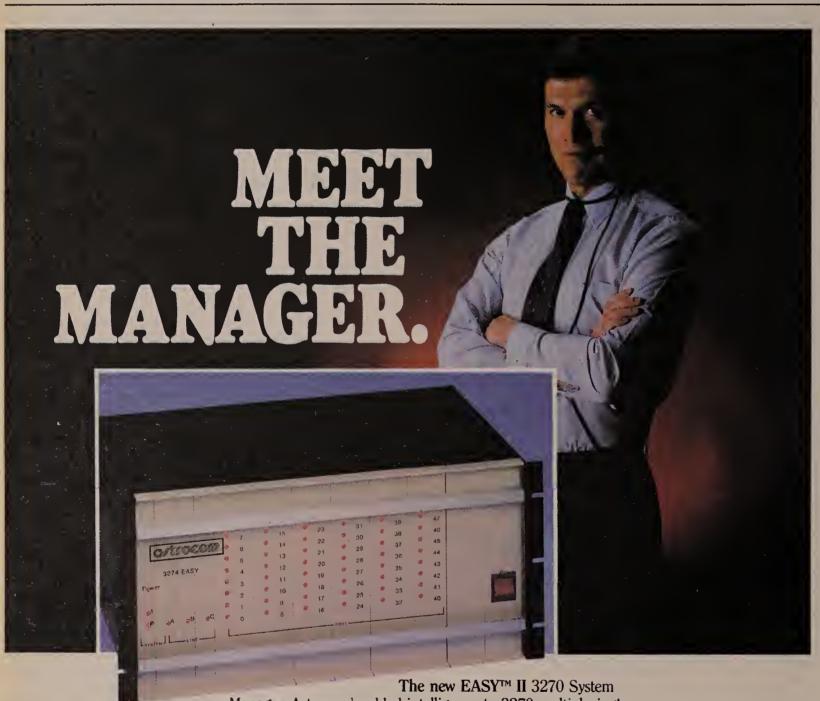
(617) 366-8911.

On Aug. 21, Ansi's SC21 TAG committee will meet in Washington, D.C. Richard Des Jardins, the committee chairman, will be the featured speaker at the assemblage.

For additional information on the meetings, contact Richard Des-Jardins at (202) 694-5921.

Ansi's X3T5.4, X3T5.1 and X3T5.5 groups will meet in Washington, D.C. from Aug. 25 to 27. Chairmen Jon Becker, John Day and Lloyd Hollis will speak at the meetings.

For more information on this trio of meetings, contact Jon Becker at (215) 341-4643. Z



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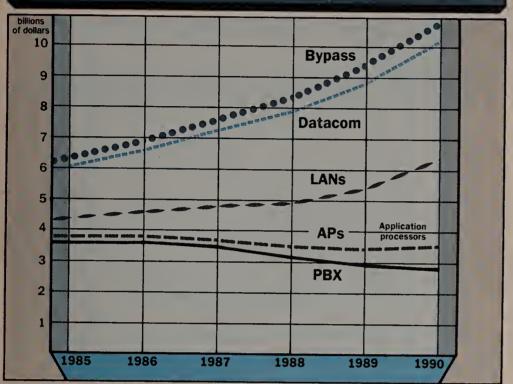
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Ron Orazine Consultant Network Systems Design Waltham, Mass.

### PBX market opportunities 1985 - 1990



SOURCE: NORTHERN BUSINESS INFORMATION, INC., NEW YORK

### **GUIDELINES**

**ERIC SCHMALL** 

### Nontechnical boss blues

ow often does the medical student lecture the chief of surgery on anatomy? How many law clerks explain common law fundamentals to judges? How frequently does the seminarian instruct the archbishop on moral theology?

Ludicrous as these examples sound, similar role reversal situations occur in communications departments. Senior staff members are often appointed to areas that encompass the organization's communications function. That individual may have sterling credentials in data processing or administrative management, but the odds are that he knows nothing about communications.

Why would such an inexperienced person be put in charge of such a complex function? Such appointments prompt renewed debate over the validity of the old maxim that asserts, "You don't have to be a watchmaker to run a watch factory." The fact remains that the communications manager who is assigned a nontechnical boss has a monumental task ahead of him — senior staff education.

It is perfectly natural for the manager to shrink from the prospect of spoon-feeding his

Schmall is network systems manager for an insurance holding company.

new boss on all communications subjects. Rather than despair, the manager should rejoice at a remarkable opportunity.

The manager is in the enviable position of being able to give his newly appointed superior a perspective that is sympathetic to the needs, concerns and visions of the communications department.

The process is slow and often frustrating both for teacher and student, as the senior staffer gradually grasps the fundamentals. It is vital that the manager/mentor measure out the information in accordance with the new person's capacity to absorb it.

Above all, the manager should not fear that his position will be diminished or his usefulness exhausted once the senior staffer is brought up to speed. No one will ever have the depth or expanse of knowledge that the manager has attained through formal education and hands-on experience in this field.

This shared information will ensure that the senior member's perspective will have a foundation in the framework provided by the manager. This goes a long way in establishing a fundamental, shared basis for common interests in communications decisions for the organization.

**PURCHASING** 

# Bartering with vendors pays

Users that haggle may get better prices, added training and support.

BY NADINE WANDZILAK

Although the prices of communications equipment may seem to be cast in stone, many users say there is always room to negotiate with vendors. While it may be difficult to get vendors to budge on price, users can also negotiate for additional training or support when they buy communications equipment.

Buyers with a lot to spend and the potential to make large or repeated purchases obviously carry more negotiating clout, said Ron Orazine, a consultant at Network Systems Design in Waltham, Mass.

But, he said, even smaller user companies can negotiate with vendors, including the giants such as IBM and AT&T.

Negotiating does not always involve trimming the purchase price of a product, Orazine said. In situations where a vendor won't cut the purchase price, a user can haggle for additional

days of training or extended support. Bargaining for a second, cost-free year of maintenance, for example, may bring the long-term cost of a piece of equipment down, even if the purchase price remains unchanged.

"There is flexibility in the scope of work to be done for a given price," said Robert Wachstein, telecommunications manager for Combustion Engineering in Stamford, Conn. That can mean negotiating for more training, for example, if a standard training package does not meet the user's needs.

One user, Overnite Transportation Co. of Richmond, Va., saved money by negotiating three rentfree months into an equipment lease with IBM. As a new customer whose employees needed training on the system, Overnite requested some time to work with the system

before the lease began, according to Edward Bromley, Overnite's vice-president and secretary. IBM agreed to let the company use the system at no cost for 80 days after cutover.

By virtue of their size, some companies can qualify as a vendor's national account, giving them better prices and additional support, according to Combustion Engineering's Wachstein. The criteria vary, said Wachstein, but generally include Fortune 200 companies or their equivalent. Wachstein suggests that companies make the move to ask for national account status.

saved money
by
negotiating
three rentfree
months with
IBM. 22

Orazine offered prospective buyers a series of bargaining tips.

- Don't accept a first offer. Make a vendor work for your business.
- Don't think the world is just AT&T and IBM. Examine other vendors' products.
- Make no assumptions about the system to be purchased. In ad-

dition to a contract, prepare a written agreement of understanding that explains in plain English what you expect to receive and what the equipment will do.

- Get a vendor to price out a piece of equipment or system completely. Sift through the proposal and understand exactly what features are essential before wheeling and dealing.
- Be sure a piece of equipment meets your present and future needs cost-effectively. Verify its capacity and expansion costs. Talk not only to the sales staff but also to the technical people. If the system was priced out at or near capacity and will need to be upgraded later, what will it cost?
- Talk to other users. The vendor's current customers can give you a good feel for what the system should really cost. 

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# NEW PRODUCTS AND SERVICES

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**TELEPHONY** 

# HP's first voice messenger out

Tool offers "snappy" user interface.

BY JIM BROWN

New Products Editor

Hewlett-Packard Co. dived into the voice-messaging market with the recent introduction of its Office Talk product. HP's first offering in this arena supports voice messaging for up to 25 users and features a voice appointment calendar that calls users to remind them of upcoming appointments.

The \$995 Office Talk offering consists of a personal computer expansion board manufactured by Natural Microsystems, Inc. of Natick, Mass., and software developed by HP. The firms jointly designed the system to work with HP's Vec-

tra Personal Computer or IBM Personal Computer AT models with at least 256K bytes of memory.

The system has been designed to take advantage of the Vectra's graphics and touch screen user interfaces, said Charles Foskett, president of Natural Microsystems. "The user interface on the Vectra is really snappy," he said.

HP bought a less than 10% interest in Natural Microsystems and will continue to purchase the expansion board from it. The firms also agreed to continue joint development of future voice products.

The expansion board has two RJ-11-type telephone jacks. One supports connection of a local tele-



phone to the personal computer, and the other connects the personal computer to the outgoing line. The board uses a Texas Instruments, Inc. TMS-320 microprocessor that was designed for digital signal processing.

Using techniques developed by Natural Microsystems, the board digitizes the analog signals received from a telephone connection and stores them to a hard disk. The signals are reconverted when stored messages are transmitted over the telephone network. With voice compression techniques, the system will store about 1½ hours of See **Voice** page 25

► DATA TRANSMISSION

# Plexus and Bridge pledge support for TCP/IP protocol

Packages run over Ethernet, offer file transfer.

Two firms recently added support for the Transmission Control Protocol/Internet Protocol (TCP/IP) network model to their product lines.

Plexus Computers, Inc., based in San Jose, Calif., announced TCP/IP support for its computers, allowing them to be linked with systems using the protocol.

Bridge Communications, Inc., located in Mountain View, Calif., released software that enables personal computers to communicate with and transfer files from IBM host systems over an Ethernet network running TCP/IP.

TCP/IP, developed as part of Defense Data Network, ensures that data is transmitted between a variety of different systems connected over a similar physical link such as an Ethernet.

The protocol is similar to the middle layers of the International Standards Organization's Open Systems Interconnect network model. Application programs residing on each host system connected to a network running TCP/IP are needed to read and use the data.

TCP/IP was recently enhanced to support Unix Release 4.2.

Plexus' TCP/IP package implements the TCP/IP protocol set and uses a microprocessor-based intelligent Ethernet processor to interface to the local net. Includ-

ed in Plexus' package are software utilities for accessing computers using the Unix operating system and utilities for using Unixlike commands to access computers running other operating systems.

Plexus claims the package supports file transfer and electronic mail across the network. The firm also said that the package has a virtual terminal function that supports access to any system on the network from any terminal attached to the Plexus system running the TCP/IP package.

Supplied on a nine-track or cartridge tape, the package is priced at \$750 for the P/20 system and \$1,500 for the P/35, P/55, P/60 and P/75 systems.

personal Bridge's computer-based TCPTerm package supports terminal emulation and file transfers between personal computers and hosts connected to an Ethernet running the TCP/IP protocol set. The TCPTerm package supports the terminalto-host communications and file-transfer protocol levels of the TCP/IP protocol set. It makes the personal computer look like a VT100 terminal on the network and allows it to access asynchronous computer ports. IBM 3270 Systems Network Architecture sessions, VAX minicomputers, Sun Microsystems, Inc. workstations and other TCP/ IP-compatible devices.

**KEY SYSTEMS** 

# AT&T drapes Merlin with new features

PARSIPPANY, N.J. — AT&T enhanced software used with its Merlin 1030 and Merlin 3070 telephone key systems.

The new feature module, dubbed Feature Module 5, is housed in a plug-in cartridge and includes enhanced automatic call routing, direct dialing to predefined work groups, identification of calls returned to the attendant station, an enhanced night service and a hold function that also dials a preprogrammed intercom number.

The call-routing feature supports 11 user-defined call-routing tables. The routing tables examine the area code and exchange numbers of each outgoing call to determine the least costly route for that call. Eight of the 11 tables support up to 100 entries of either the full six-digit area code and exchange or three-digit telephone exchanges. Two other tables are default tables for frequently used exchanges, and the last table is available for special exchanges such as a 911 emergency exchange, a 411 directory assistance exchange and 800 or 900 exchanges.

The module can bypass an attendant station in order to reach a preselected work group directly. The system will support six preselected work groups, each of which can comprise 15 telephone sets. One telephone set in each work group is selected to receive an incoming call.

The module will also allow users to place an incoming call on hold and access a preprogrammed intercom number by touching one button. It will also identify which telephone set is transferring a call back to the attendant station and adds options for after-hours answering of incoming calls and restricting outgoing call access at night.

Feature Module 5 includes features found in Feature Module 4, including multiline pooling and directed line pickup. Priced at roughly \$1,500, Feature Module 5 will be available in the fall.

# Network Services from Bell Atlantic. Communications solutions responding to today's needs. And tomorrow's potential. **Central Office** LANS Public Data Network Digital Connect Service High Capacity Lightwave Service



etwork Services. A flexible, technologically advanced family of digital transmission services developed by the Bell Atlantic Companies to optimally match user needs to highly-efficient, cost-effective voice and data transmission services.

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### **PRODUCTS & SERVICES**

### Network translator switch

Sytek, Inc. has introduced a local-area network translator switch for its System 2000 products that provides automatic translator unit backup in case of an on-line unit fault.

If the 2555 Translator Switch detects a fault in the on-line translator unit, it automatically switches operation to a second, back-up translator unit. Fault detection and switching occur in 100 milliseconds, according to Sytek, resulting in no detectable interference for the user and no loss of data on the network. The switch, which resides at the head end of Sytek's System 2000, monitors both the power and frequency ranges of translator units.

The 2555 automatically alerts the network manager when a fault is detected in either of the two translator units by beeping and illuminating a warning light. The self-monitoring device takes itself-out of operation in case of fault.

Priced at \$4,000, the 2555 conforms to the IEEE-recommended radio frequency channel offset of 192.25. This enables compatibility between network devices by spacing transmit and receive signals 192.25 radio frequency bandwidths apart.

The **5211** Bridge Interface Kit provides user access to all subchannels of Sytek's System 2000 and Localnet 20 when used with a Sytek bridge/link. Each 5211 provides an automatic, user-transparent connection between any devices on the Sytek network. The kit is priced at \$4,750.

Sytek, Inc., 1225 Charleston Road, Mountain View, Calif. 94043 (415) 966-7300.

### Voice messaging system

Octel Communications Corp. recently added another model to its voice-message system product line, introduced voice messaging software geared for the publishing industry and enhanced the message storage capacity of its Aspen system.

The firm introduced its **Aspen Maxum** voice message system, which provides up to 72 ports supporting up to 7,500 subscribers for a maximum of 312 hours of recorded voice message storage.

The Aspen Maxum offers the same features and capabilities as Octel's other Aspen systems. Existing Aspen and Aspen Branch systems can be upgraded to Aspen Maxum systems, a company spokesman said.

All three systems can be integrated with a number of private branch exchanges, including Northern Telecom, Inc.'s SL-1; Mitel, Inc.'s SX-100, SX-200, SX-1000 and SX-2000 models; Hitachi Ltd.'s DX; and InteCom, Inc.'s IBX S/40 and IBX S/80.

Octel also released **Newscomm**, a messaging system tailored for the newspaper and publishing industries.

The Newscomm system routes

callers to voice message recording systems within the circulation, editorial, classified advertising or display advertising departments of newspapers.

The firm also upgraded its Aspen system by expanding its message storage capacity to 98 hours.

Retail prices for the Aspen Maxum range from \$155,000 to \$631,000; a typical 64-port version supporting 175 hours of storage costs \$418,000. Prices for the Newscomm system start at \$45,000.

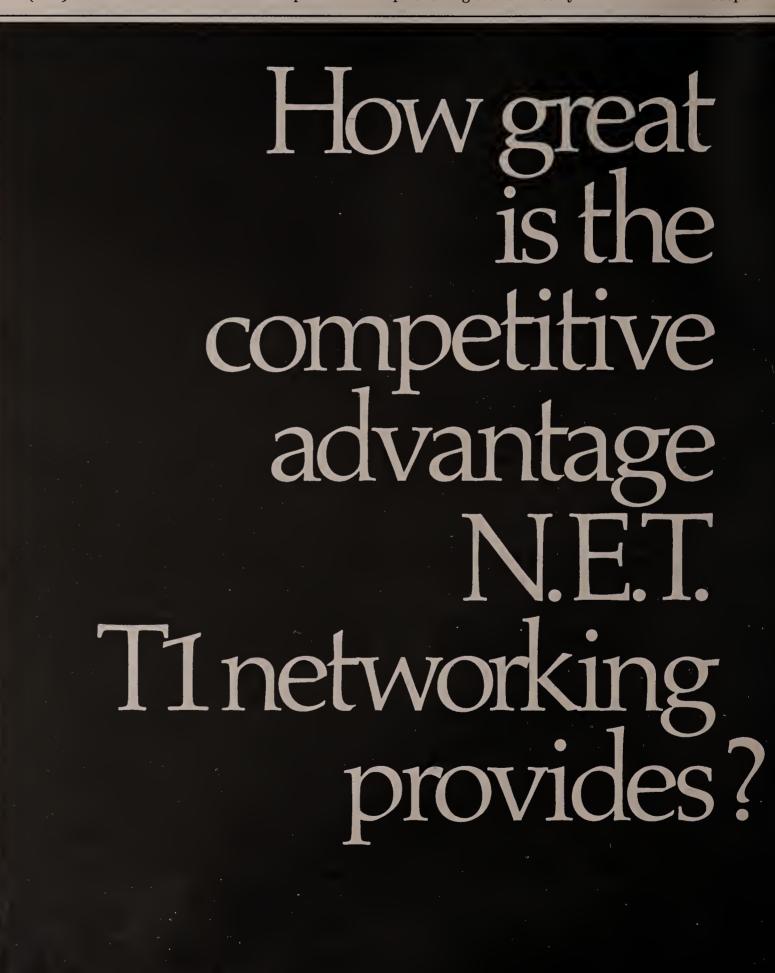
Octel Communications Corp., 890 Tasman Drive, Milpitas, Calif. 95035 (408) 942-6500. Call-handling software

Innovative Technology, Inc. introduced software that works with the company's previously released IBM Personal Computer expansion board and provides automated telephone messaging and call handling for 10 users.

NitaReceptionist is used in conjunction with Innovative Technology's Nita personal computer expansion board to answer, route and screen calls automatically, as well as record messages on up to four incoming telephone lines. A Nita board-based computer-generated voice asks incoming callers to press the push-button phone digit that

corresponds to the person with whom they wish to speak. If a digit is selected, the caller is asked to state the purpose of the call. The system then places the caller on hold and replays the message to the person being called, who then determines whether to accept, reject or forward the call.

If the person being called is unavailable, nitaReceptionist offers the caller the option of waiting on hold, selecting another person, leaving a voice message or being transferred to a live receptionist. If no digit is selected when the call is first answered, the call is automatically transferred to a receptionist.



### **PRODUCTS & SERVICES**

The nitaReceptionist operates as a background task on personal computers with 512K bytes of memory and a 10M-byte hard disk. It operates in areas where central offices offer call-transferring, call-forwarding and call-waiting features.

The nitaReceptionist with the Nita board costs \$2,595.

Innovative Technology, Inc., Suite 422, 1000 Holcomb Woods Pkwy., Rosewell, Ga. 30076 (404) 998-9970.

### Portable fiber-optic test unit

A portable unit for testing fiberoptic transmission cable of up to 100 kilometers in length was introduced by **Fotec**, **Inc**.

Powered by a rechargeable battery or AC line power, the **Model S400** uses the same light sources as system transmitters, and when used with an appropriate power meter, the unit is designed to measure up to more than 50 decibels of signal loss.

The unit is outfitted with one or more of up to six optically stabilized light-emitting diodes or temperature-controlled lasers that support 850, 1,300 or 1,550-nanometer wavelengths on single or multimode fiber.

The S400 output can produce

continuous wave or be modulated by an internal clock, which makes it compatible with other fiber-optic measurement instruments, including the AT&T Smolts.

It can also be modulated by an external clock for synchronous measurements.

The base price of the S400 is \$2,700. A 1,300-nanometer wavelength module is priced at \$4,500, while a 1,550-nanometer wavelength module is priced at \$7,500. Pricing for other sources is set according to customer specifications.

Fotec, Inc., The Schrafft Center, 529 Main St., Box 246, Boston, Mass. 02129 (617) 241-7810.

### PCs linked to Plexus minis

A software package linking IBM Personal Computers and compatibles to Unix data bases residing on Plexus minicomputers was released by Plexus Computers, Inc.

The Multiplex package resides in Plexus minicomputers and in the personal computer. It reformats Unix data bases for use in a personal computer application. The package also supports transfer of spreadsheets, reports and other documents from a personal computer to a Plexus minicomputer over an asynchronous link provided through an RS-232 serial port. The package supports terminal emulation allowing the personal computer to run Unix programs.

Pricing of the Multiplex package for Plexus 15 and Plexus 20 models is \$1,100; for the Plexus 35, Plexus 55, Plexus 60 and Plexus 75 models, it is \$3,000. Prices include the software for the personal computer.

Plexus Computers, Inc., 3833 North First St., San Jose, Calif. 95134 (408) 943-9433.

### Voice from page 21

voice messages on a 10M-byte hard disk.

With the system software, users can create a telephone directory with the names and telephone numbers of up to 500 persons. The telephone directory can be used for storing frequently called numbers. When used in conjunction with an automatic dialing feature, the telephone directory can support telemarketing applications.

Users can record a message on the system and program it to call any one or combination of the 500 persons in the telephone directly to deliver that recorded message. The message could also be stored in any of the up to 25 mailboxes the system will support.

People calling into the system are greeted by a recorded message asking them either to leave a message or enter an identification code and password through a push-button telephone or a tone generator-equipped rotary telephone in order to access their voice mailbox. Once access has been gained, users can search the mailbox for specific messages. The system will also convert text messages to voice-synthesized speech, a feature that supports voice access to text files from a remote telephone.

The system also supports an appointment calendar. The feature allows users to store a voice message concerning the appointment and program the system to call the user's telephone at a specified time. The prerecorded message is then played back as a reminder of the appointment.

An unattended autodial feature lets users program the system to call repeatedly a busy or unanswered number at predetermined intervals and play a user-recorded message that asks the receiver to hold when the connection has been made. The system then alerts the user to the call's completion.

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Heady claims, and a number of

vendors are making them. Too few can back their claims with success stories. We can. But not in this ad.

### Here's what puts N.E.T. customers ahead:

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# Opinions

POLICY

**ALAN PEARCE** 

### Modifying the Final Judgment

One of the most important

telecommunications policy pronouncements in the next several months will come from the Massachusetts Institute of Technology — not from Capitol Hill.

Peter W. Huber, a lawyer with a doctorate in engineering, is busy working with his four-person staff there to prepare what could be the most important document for the business prospects of the Bell operating companies.

What once appeared to be a minor section of the Modified Final Judgment in the AT&T case is now expected to have enormous ramifications on the future of the communications and information industries.

When the Modified Final Judgment was announced in 1982, it contained a provision that instructed the U.S. Department of Justice to prepare a report for U.S. District Court Judge Harold Greene. In that report, the Justice Department is required to suggest any changes that should be made on BOC business restrictions.

The report must be submitted to Greene, and now to the U.S. Congress, by Jan. 1, 1987. A second report is planned for Jan. 1, 1990, assuming the Modified Final Judgment is still in force.

Huber, who served as a law clerk to Supreme Court Associate Justice Sandra Day O'Connor, was specially recruited as a report researcher and writer by his former Harvard professor, Doug Ginsburg, who is currently assistant attorney general for the Antitrust

Pearce is president of Information Age Economics in Washington, D.C. Division of the Justice Department. At the time of his appointment, Huber had no knowledge of the telecommunications industry.

Huber recruited four aides to help him research and draft what is rapidly becoming known as "the Huber report." Two of those aides are Florence Setzer from the Federal Communications Commission and attorney Ben Gilberti, both of whom are working on information services issues. The remaining pair is Mike Volkoff and Mary Fitzpatrick, who are working on equipment manufacturing.

Little is known about the structure of the report. It is also not known whether it will even be made public, because the Modified Final Judgment did not specify. However, at least four of the following major questions will be addressed and analyzed.

■ Should the BOCs be allowed to enter the telecommunications equipment manufacturing business?

Under the Modified Final Judgment, they are strictly forbidden from having any control over this area, though they are allowed to market, install and maintain customer premises equipment.

- Should the BOCs be allowed to enter the information services business? Again, there is a ban imposed on the BOCs, even though the FCC, in its recent Third Computer Inquiry ruling, made it clear that it wants the BOCs to offer information services, which would be subject to certain fairly stringent regulatory restrictions.
- Should the BOCs be allowed to offer long-haul telecommunications services? Currently,

the BOCs are allowed to offer only intralocal access and transport area long-haul services. They are specifically precluded from offering inter-Lata or interexchange services in competition with AT&T Communications, Inc., MCI Communications Corp., Satellite Business Systems, US Sprint Communications Co. and others, largely because these long-haul carriers depend on the BOC's facilities for the origin and termination of their traffic.

■ If the BOCs are allowed into any or all of these lines of business, what safeguards should be established to protect against improper cost shifting, discrimination and other forms of anticompetitive activity? If any of the restrictions are lifted, there will have to be some safeguards to protect emerging competition.

Equipment manufacturers, information services providers and the powerful long-haul carriers would not be prepared to stand by and allow the BOCs to enter their businesses without any safeguards whatsoever

This implies that the Huber report may revive the separate subsidiary concept at a time when the FCC is pushing for its abolition.

Greene has adopted the separate subsidiary concept, whereby the BOCs must acquire from him a waiver of the Modified Final Judgment to establish separate subsidiaries and get into different businesses.

It appears the Huber report will propose some business relief for the BOCs. This is presumably part of the strategy behind the

See **Policy** page 37

INTEGRATION

**BRIAN JEFFERY** 

### A buzzword is born

Announcing the new telecommunications industry buzzword: "complex systems integration."

It's time the industry had a new buzzword. "Office automation" just isn't cutting it any more, and "departmental resource processing" cannot go on much longer before everyone realizes it isn't happening. "Integrated Services Digital Networks" still has a way to go, and there are problems with the term "software-defined networks." Aren't all networks software-defined?

Cast away all those fine phrases and meditate on complex systems integration: the management of tasks in the implementation of major systems on a project basis. Usually, one or more vendors, software houses or specialist firms assume responsibility for the whole process.

Jeffery is research director at the International Technology Group in Palo Alto, Calif. Complex systems integration does not involve new technologies, products or concepts. It is simply an organizational issue about how suppliers provide services. Ironically, the telecom industry would rather deal with a new technology than with a new way of organizing itself, which is why the idea has taken so long to catch on.

But complex systems integration is, undeniably, taking off. IBM, for example, earned more than \$1 billion last year from complex systems integration projects. The company made more than 12% of its U.S. System/36 sales in 1985 through such projects and has designated a unit of its Federal Systems Division to go after the commercial market.

A few phone calls to some of the other big federal systems integrators show that they, too, are starting to go after the commercial market in a big way.

Depending on which components are included — such as standard

hardware and software, customized products, service, training and support — complex systems integration is already a \$2 billion to \$30 billion market. By 1990, it's going to be much larger.

Some quick surveying by International Technology Group has turned up more than 20 corporate end users in the U.S. that are likely to spend at least \$1 billion on complex systems integration projects over the next five years. Furthermore, just about everyone on the user side says complex systems integration is the kind of idea companies would go for if someone would be so kind as to offer it to them.

There's nothing new about the idea of complex systems integration. For many years, the federal, state and larger local governments have used the prime contract approach, which is when a single, or prime, vendor takes responsibility for the entire multivendor project.

Federal buyers, in particular, make this approach the norm for

large projects.

Specialist companies such as Computer Sciences Corp., Martin Marietta Co., Electronic Data Systems Corp. and many smaller firms will handle software integration. They take responsibility for making all of the components from different vendors within a system work together. They have the skills and the experience to define requirements, assemble technical teams and manage projects.

In general, complex systems integration works well. Federal customers report that the up-front work in defining requirements and proposing solutions is typically more thorough and comprehensive than in most commercial procurements. A single point of contact through a single company that takes responsibility for projects is generally regarded as an improvement over the more haphazard vendor relations that most commercial end users experience.

The current commercial market for complex systems integration seems to be the tip of the iceberg. At the moment, large corporations are primarily using this approach. General Motors Corp., for example, is in the habit of throwing projects

# Opinions

# Are you the lady who wants to link her PC to the mainframe?

worth \$200 million to \$350 million at its EDS subsidiary — the largest dedicated integrator in the industry. GM accounted for more than half of EDS' revenue in 1985.

Similarly, the commercial customers of IBM's Federal Systems Division are mostly big boys such as Ford Motor Co., Hospital Corp. of America, Equitable Life Insurance Co. and Texaco, Inc. The same pattern applies to the other systems integrator "professionals" who cut their teeth on federal government procurements.

This is starting to change, however, partly because interest on the end-user side is growing and partly because a field of smaller and more flexible companies is emerging that can handle the kind of mid-range prospects that an EDS or a Martin Marietta normally would not want to deal with.

Computer Task Group, Inc. in Buffalo, N.Y., for example, is a cheery and dynamic \$116 million firm that will throw programmers at any problem. Xerox Computer Services, the Big Eight accounting firms and some 60 other firms will handle projects in the \$100,000 to \$20 million range. In addition, the regional Bell operating companies,

the independent telephone companies and telecommunications firms such as Contel Information Systems, Inc. will set up a custom network from multivendor equipment and make it run.

The industry is at a watershed. Historically, the industry's progress has always been piecemeal and patchy. There have always been separate groups of vendors for mainframes, minicomputers, personal computers, word processing equipment and software from independents.

On the telecom side, there have been interconnect private branch exchange vendors, network suppliers and data communications equipment suppliers. The one company that used to supply end-to-end telecommunications, AT&T, is divested of its regional and local operating companies. The resulting vacuum has been filled by many suppliers, fragmented regulatory authorities and tariff uncertainties.

Meanwhile, a growing number of end users have been implementing increasingly complex and sophisticated networks and are moving toward integration of their varied

Continued on page 37

**CORPORATE USERS** 

JAMES CARLINI

# In search of a freebie

Conclusion of a four-part series.

The search for integrity zeros in on the corporate side of telecommunications.

One way some corporate users obtain additional equipment during their peak production times is by calling vendors and offering to test terminals, printers or other equipment on a 30-day or 60-day basis.

The users have no intention of keeping the equipment beyond the initial testing period. They may use it without any long-term commitment.

Some vendors have caught on to this abusive practice and have begun limiting their short-term loans of equipment to qualified buyers who are already customers.

Sometimes corporate executives will call consultants to ask a simple question. They may give the consultants the impression that they are looking for someone to assist in a project. A user might ask a consultant for an approach with enough detail to make sure the consultant understands the problem.

In actuality, the user is only trying to get the consultant to provide him with a general blueprint that he can follow without further help from the consultant.

One large consulting firm experienced a variation of this situation. The client company cleverly expanded the scope of a project for which it had already contracted with the consulting firm

The consulting project manager was unaware of the scope to which the project had been expanded.

The budget was used for this extra work without the original project being completed. The client's upper management then demanded that the consulting firm finish the project without an additional budget, even though parts of the project not covered in the original contract were completed.

There are more examples of corporate users attempting to get free solutions to their

Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill. telecommunications problems from vendors and consultants.

Many times, they will disguise such an attempt as a preliminary work plan request or as a prerequisite for the vendor or consultant to be accepted as a qualified bidder for a proposal.

In some cases, AT&T Communications, Inc. has designed multistate networks for customers only to find them used as blueprints for other vendors to implement.

A church in the metropolitan Chicago area was upgrading its phone system.

When the church approached Illinois Bell to find out if it needed to increase the number of its lines, it was told definitely to expand because of the results of an allegedly performed busy signal analysis.

When a church official called back to get a copy of the report, the phone company representative told him that the study had not actually been completed and that an analysis would have to be done.

The timetable provided one week to set up the study, two weeks to do the study and two weeks before the analysis could be sent to the customer.

When Illinois Bell actually implemented the study, the church's phone system needed to be down for a day.

The moral is that everyone is treated equally because of universal service

Everyone needs to strive a little harder to put more pride back into his work — whether it's in manufacturing, sales, service or management. Some people will continue to make up what they lack in talent by politicking, scheming or cutting bad deals that shortchange everybody.

For those people, there is no hope, and they will eventually get what they deserve. For those who are already trying to do better, this four-part series on integrity was meant as positive reinforcement. For those who are sitting on the fence, hopefully the point has been driven home: If you are not part of the solution, then you are part of the problem.

Don't encourage a lack of integrity.

Demand better service, products that work and — most of all — a fair deal.



### **Features**

August 18, 1986

Testing telephone lines

Analog telephone line test equipment is often worth its expense and irritation to telecommunications managers. Being able to isolate the problem on a circuit means quicker service for users and fewer headaches for management. Today's testing units can even be programmed to initiate measurements automatically. This page.



### The human network

Built into every local-area network is a philosophy of how its users will work. It's called network culture, and the human element is its key component. Matching the system design to existing work patterns preserves the delicate fabric of the human network.

Page one.

### Network management nips downtime in the bud

Although network management systems may seem to be just another expensive appendage, they can actually save downtime costs. Not only do they alert operators of potential trouble, but they

also identify problem sites for faster repairs. Users jumping on the network management bandwagon are expected to spend \$575 million by 1989. Page 33.



PRODUCT FOCUS

# Testing telephone lines

Instead of pointing fingers, managers can pinpoint problems.

The following are components to be measured on an analog line, as stated in *Bell Publication 41009*.

**Loss** — Power loss of a signal traversing a transmission medium in both directions, expressed in decibels.

**Noise** — Background noise on an idle channel measured in each direction.

**C-notch noise** — Measurement of metallic noise while a 1,000 Hz tone is present through the active components on a circuit. The tone is filtered or "notched out" during measurement.

**C-message noise** — Noise on a line measured in relation to a particular frequency.

Impulse noise — The component of a received signal that has been band-limited and exceeds route mean square noise level in that band by 12db.

Envelope delay distortion — A derivative of the circuit phase shift with respect to the frequency. This distortion affects the time it takes different frequencies to propagate the length of the communications line.

Return loss — A measure of the mismatch between the actual transmission circuit impedance and the normal impedance. Phase jitter — Short-term instability of the signal's phase, making it very difficult for receiving modems to sense phase

changes.

Amplitude jitter — Undesired amplitude modulation on a received signal.

Intermodulation distortion —

Compression that causes harmonic and intermodulation distortion in the transmitted signal. This frequently causes modems to lose signal tracking.

Peak-to-average ratio (P/AR) —

Measurement of a particular

Measurement of a particular test signal to determine distortions taking place over a given transmission path.

Hits and dropouts — Rapid changes in the gain or phase of a received signal or loss of signal

Single-frequency interference — Spurious steady tones present on the channel, which are heard in addition to the transmitted signal.

Bell Code 105 test — The ability to transmit the tones and sequence necessary to access a Bell 105 responder.

Bell Code 107 test — The ability to transmit the tones and sequence necessary to access a Bell 107 responder.

Bell 829 responder — The ability to transmit the tones and sequence necessary to cause this responder to go into loop-back mode.

Automatic testing — The ability to predefine circuit tests and have them executed at remote locations in a totally unattended mode.

— John J. Hunter

### Specification chart: analog telephone line test equipment

Vendor	Model	Loss	Noise	C-notch noise	C- message nolse	Impulse noise	Envelope delay distortion	Return loss	Phase jitter	Amplitude jitter	Peak-to- average ratio	Hits & dropouts	Single frequency Inter- ference	Bell code	Bell code 107 test	Bell 829 test	Automatic testing	Price
Ameritec Corp. 800 E. Arrow Hwy. Covina, Calif.	AM 5	7	7	7	V			7			V					-	~	\$3,495
Convex Corp.	802	V	Lo .	V														\$1,680
P.O. Box 17225 Washington, D.C.	808	~	7	~	~												-	\$1,665
CXR Telcom Corp.	548A	~	~	V	V	V	V	V	V	V	V	V	~	V			V	\$6,995
2121 Zanker Rd. San Jose, Calif.	156 AP	1	7	~	~	7	V	V	~	V	~	~	1	~	~			\$2,050
Digilog, Inc. 1370 Welsh Rd. Montgomeryville, Pa.	NAMS	1	7	-	7	0	0	0	0	0	0	0		V	V		0	\$20,000 (includes matrix switch)
Electrodata, Inc. 23020 Miles Rd. Bedford Heights, Ohio	AG 1	7	7	1	7	-										~		\$220
Hekimian Laboratories, Inc.	3701	100	~	V	V	0	0 .	0	0	0	0	0		V	200	13870 13377		\$6,500 (4 KHz)
9298 Gaither Rd. Gaithersburg, Md.	3705	~	7	V .	~	0	0	0	0	0	0	0		7	~	1 =		\$6,700 (4KHz)
Hewlett-Packard Co. 1501 Page Mill Rd. Palo Alto, Calif.	4945 A	7	7	7	7	7	~	~	7	~	~	-	~				-	\$14,950
LP COM Co. 205 Revendale Drive Mountain View, Calif.	2000-01	7	~	7	-	7	<b>V</b>	-	~	· /	-	-		-		~		\$8,145
Network Control Corp.	Janus II	~	V	V	V	V		~									V	\$5,500
34 Bacus Ave. Danbury, Conn.	Janus ile	7	7	V	V	1			~		-						-	\$11,500 (250-line unit)
OneCom, Inc. 2905 Wilderness Place Boulder, Colo.	Netwatch 48	7	7	1	7	1												\$5,300 to \$13,000
Wilcom, Inc. P.O. Box 508 Laconia, N.H.	T328	~	1	7	7	7		~	0		0			~			-	\$7,995

0 = Optional

SOURCE, TMS CORP., DEVON, PA.

### **BY JOHN J. HUNTER**

Contributing Writer

Now that carrier services are split between the regional Bell operating companies and the common carriers, telecommunications managers frequently find themselves calling both communications suppliers to identify and resolve problems, only to find that neither party will own up to them.

Telecommunications managers need equipment that will identify the root of the problem. Analog telephone line test equipment is a

source of relief.

These products measure the operating specifications established by the carrier for switched or dedicated telephone lines and report those parameters not meeting the

Most of these measuring devices can also isolate the problem to a particular part of the transmission facility, such as the local loop, the local telephone company central office or the long-distance carrier, allowing users to contact the guilty party. Then the fun begins.

### Class of equipment

Within the U.S., the most prevalent transmission standards for voice-grade telephone lines are those outlined in Bell System Publication 41008 dated July 1974. The general techniques used to measure these transmission characteristics

Hunter is president of TMS Corp. in Devon, Pa.

are given in Bell Publication 41009 dated May 1975. All of the equipment described follows the 41009 recommendations for the tests they perform. Available analog test equipment ranges from units to test telephone lines for loss level and noise, to those that perform sophisticated tests to detect phase jitter or envelope distortion delay (see glossary on page 28).

What the user chooses depends on the application involved. For voice transmission, a circuit is considered acceptable when one party is able to hear the other with a minimal amount of fading and noise. Data transmission, however, requires a much cleaner transmission circuit, because modems cannot compensate for line impairments the way the human ear can.

Line characteristics such as phase jitter, envelope distortion delay, impulse noise and background noise all adversely affect data transmission because modems especially the higher rate modems with sophisticated data encoding schemes — cannot compensate for them. These characteristics greatly increase the number of errors produced with transmitted data.

The most rudimentary test is to measure the level of loss and noise between the originating and terminating points on the network. This is accomplished by inserting a 1,000 Hz or 1,004 Hz tone at one end of the circuit and measuring the results at the other end.

The loss is measured in decibels and compared with the loss speci-

fied by the carrier for that line, as well as any losses from the customer's equipment. A 1,004-Hz tone is also used for tests that measure characteristics such as idle channel noise, C-message noise, C-notch noise, signal-to-noise ratio, amplitude jitter, frequency translation, phase hits, gain hits and signal dropouts.

Some products require that attended test and measurement equipment be available at both ends of the circuit. These units make measurements in one direction for each test.

Others access tone responders that are located within the local telephone company central offices or at the customer's location. They command those responders to loopback the transmitted tone for measurement, and they can determine problems in both circuit directions.

The most common responders that the local operating companies use at their central offices support the Bell Code tests 100 through 107 and activate the Bell System 829 and remote isolation device (RID) responders installed at the customer's site. Bell tests 100 through 107 are conducted by calling the responder and initiating a predetermined series of test tones and time sequences.

Customers' tone generators that follow these series of instructions can access the central office responder. The returned tone allows users to determine if the problem exists in the local line or in the cen-

Continued on page 30

From page 29

test equipment.

tral office equipment.

The Code 100 test is the simplest of the group. It conducts circuitlevel loss and noise tests. The most sophisticated test, Code 107, measures transient phenomena and pinpoints the conditions of those data impairments. The most useful test is Code 105, which measures two-way analog losses plus impairments affecting data transmissions such as peak-to-average ratio, nonlinear distortion, signal-to-noise ratio and phase jitter.

AT&T Communications, Inc. performs similar measurements through its Centralized Automatic Reporting On Trunks (Carot) system. Carot also accesses user-supplied responders supporting testing procedures for Codes 100 through 107. This is extremely useful when AT&T is able to verify a problem reported by the user's independent

The Bell 829 and RID responders are used to loop-back test tones between customer or AT&T test centers. The Bell 829 is installed at the end of a 3002 four-wire leased line, accepts a 1,004 Hz test tone and loops it back to the originator. This test, however, determines only whether the tone can be heard. Because it measures only signal levels, it is of questionable value for data transmission verification.

The RID responders, which work with two-wire lines, respond to a test tone by sending a tone to the testing location. RID responders also only test whether the tone can be heard.

The next level of test equipment uses third-party tone generators and responders. The responders generally reside in the customer's private branch exchange and are more sophisticated than the Bell units in that they measure the received tones, store the results and return them on demand to the testing location. They provide a more accurate reading of the test results, because no amplification of the test tone occurs as with pure loop-back test responders.

In addition, these responders provide two-way line testing. Like the Bell 105 and 107, many of these units can be programmed to perform sophisticated measurements of data impairments. Products like CXR Telcom's 548A; NCC Industries, Inc.'s Janus; and Wilcom, Inc.'s T328/T348 use their own responders.

### Automatic testing

Some vendors also provide intelligent units that can be programmed to initiate a full range of tests and measurements automatically. These products can use personal computers and special software packages that allow users to define tests to be run and to download the test files to remote-tone generators and responders.

The defined test files usually contain the tests to be performed, test thresholds, parameter values, test lines and responder numbers, as well as the times and dates of testing. The results are sent to a display or a printer at the remote location and uploaded to a central

test location.

When used with a PBX or matrix switch, these units can perform many tests on many lines during the times the user indicates. Being

able to sample lines during different operating times and conditions helps to clarify whether the circuit is meeting the overall specifications.

Which measures two-way analog
losses plus impairments affecting
data transmissions such as peak-toaverage ratio, nonlinear distortion
and signal-to-noise ratio. ??

The matrix switch is especially useful in isolating failures that can be attributed to the PBX. By shutting circuits around the PBX, the matrix switch permits circuits to be tested with no PBX involvement.

### What users and vendors say

Users and equipment manufacturers frequently ask if these testing devices are worth the money. What's the advantage of testing the lines if the carriers also perform such tests? And how can users be sure the carriers will accept their results? Users just don't seem to trust the carriers or the RBOCs, and this equipment gives them the opportunity to conduct their own tests.

"No carrier has the same sense



of urgency about your network that you do," states Mike Bitterman, vice-president of sales for Network Control Corp. Bitterman is not just another carrier-bashing marketer. He was, until recently, director of telecommunications for a Fortune 100 company.

"The communications manager wants the highest quality circuits possible, and the carrier sales people will tell you the same thing. But talk to the guys in the tech centers; they'll tell you that with all the calls they get, the tech guys just want to get the lines back into service as quickly as possible. That doesn't make for high-quality circuits," Bitterman continues.

Bob Tyndall, manager of product development for Digilog, Inc., agrees. "The carrier is in business to provide a line that meets specs; whether or not it's of good quality doesn't matter to them. The customer had better have equipment

that can measure circuit quality," he says.

One user, who wishes to remain anonymous, says quality is often secondary to carriers. As the head

**66** The carrier is in business to

provide a line that meets specs;

whether or not it's of good quality

doesn't matter to them. The customer

had better have equipment that can

measure circuit quality. "?"

of communications for a major manufacturer, he uses MCI Communications Corp. and US Sprint Communications Co. services, but he is primarily an AT&T customer. He recounts his experience of

telling AT&T that his company's network had problems with circuits serving a division in the South. It was so bad that the plant manager wanted to be taken off their electronic tandem network. They asked the carrier to "shoot" the network, and they were told that everything was OK.

"We knew everything wasn't OK, so we shot the network with our own gear and found that the circuits were between 10db and 12db of our spec. We reported this to AT&T, which verified the test and made the corrections. We rechecked the circuits and found all were now 20db long. AT&T had adjusted them the wrong way," according to the user.

The importance of being able to take exact measurement is echoed by Henry Vincent, a market analyst with Wilcom. "You're always better off if you can describe the exact problem and the level to which you've isolated it.'

Bitterman agrees that if users can tell the carrier exactly how much the phase jitter is off specification, they're more likely to get a quick repair. Tyndall seconds that opinion. "If [the carrier] knows that you know what you're taking about, and you're going to verify the fix, [it will] make sure the problem is fixed right the first time," he

With the highly competitive pricing among long-distance carriers, many users employ several services to handle different points in the network. "That's a tough problem," Bitterman says, "since each carrier will test only demarcation point to demarcation point. After that, it becomes the customer's problem."

According to Ron Kornet, AT&T staff manager of analog services, when one of AT&T's customers has a problem involving different carriers and RBOCs, the company will trace the problem and inform the customer of the outcome. AT&T will not work with other carriers or the RBOCs unless the customer specifically requests it, and then only for a fee.

MCI's position is similar. "We'll certainly work with other carriers, the RBOCs and even the equipment vendors if the customer requests it," says John Houser, MCI's director of public relations. "Normally, we don't charge unless the time becomes excessive," he adds.

US Sprint's policy is the same, according to Ralph Veazey, director of network implementation. "We'll go as far as sending a technician to the customer's location to perform tests at no additional charge," he states. "We'll do it if the customer spends as little as \$500 a month," Veazey says.

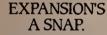
The carriers encourage the use of independent test equipment. Each says that it scans its networks constantly to detect major problems, but they admit they can't

Continued on page 32

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From page 31

routinely check everything. High loss and noise level checks are always monitored, as are out-of-spec parameters, such as phase jitters, that might affect supergroups. Beyond that, special tests must be run to respond to customer complaints, and that's where independent helps.

"Trouble frequently oc-

66 High loss and noise level checks are always monitored, as are out-of-spec parameters that might affect supergroups. ??

curs in the local loop, and AT&T may have only one set of cable pairs out of the affected cable going to another city," Kornet says. lem," he continues. "The customer's own test equipment would come in handy for this type of prob-

Although long-distance carriers might be magnanimous in accepting indepen-

dent readings, users can't count on the same cooperation level from the local operating companies. As one user says, "Even after AT&T traced the problem to the local company and our equipment showed problem was in the local loop, they still didn't believe us."

The local company pointed the finger at the PBX, and as far as that RBOC was concerned, it was no longer its problem. "What really irked us was that the local company didn't even tell us it closed the trouble ticket. When we called AT&T, AT&T put a tracer on it and found out what happened." After a number of go-arounds with the local operating company, the PBX vendor proved that the problem was in the local loop, and everything was finally fixed.

In these early years of divestiture, communications managers find themselves alone in dealing with network problems. The better prepared they are in pinpointing problems, the more likely it is that the cir-

> 66 The problem

was shown to be in

the local

loop. ??

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cuits will be repaired quickly. That's the only way to ensure top service for internal customers.

The capabilities of the products range from simple level loss and noise measurement equipment products that can detect and measure transient problems. For just voice transmissions, these devices may suffice.

However, when the customer's transmission equipment is blamed for the problem — and occasionally, rightly so — it is the manager who has to prove otherwise. Because the carriers and RBOCs are in a position to play hardball when it comes to owning up to a problem, buying equipment that can pinpoint the source of a problem is a good long-term investment.

Those units that can access the Bell responders and test local loops can eliminate a major source of the finger pointing and put the problem into the carri-

er's domain. 🔼

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95. Other\_ 85. Financial Analyst

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 Approve the Acquisition
 Identify/Evaluate Potential Vendors
 None of the Above Check ALL that apply in columns A and B. A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services: B. These products and services are presently in use at this location: A B Product/Services A B Product/Services Computers Transmission/Network Services Equipment 01. 🗆 🗖 Micros 02. Minis Satellite Earth Stations 03. 

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☐ Test Equipment
13. ☐ 3270 Controllers Centrex Telecommunications ☐ PBXs ☐ Key S 14. 🗆 15. 🗆 Key Systems 16. Central Office Equipment 17.  $\bar{\Box}$ Integrated Voice/Data Estimated value of communications systems, equipment and services: A. which you helped specify, recommend or approve in last 12 months? Check only ONE in column A. B. which you plan to specify, recommend or approve in <u>next 12 months?</u>
Check only ONE in column B. В Α 1. Over 10 million 6. 🗆 \$100,000-250,000 2. | | 3. | | 4. | | 7. 🗆 8. 🗆 000 \$5-10 million \$50,000-100,000 \$1-5 million Under 50,000 \$500,000-1 million Don't know 5. 🗆 \$250,000-500,000 Estimated gross annual revenues for your entire company/institution: Circle only ONE. 1. Over \$1 billion 3. \$5 million to \$100 million 2. \$100 million to \$1 billion 4. Under \$5 million

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# Laboring full-time to ward off downtime

**BY ART ALBERDING** 

Special to Network World

A good network management system is to a company's data communications network devices what a good corporate manager is to his employees.

The corporate manager must be able to detect and resolve employee problems as they occur, either correcting what's wrong immediately or finding the best way to work around a problem until it can be

Likewise, a network management system continually checks the communications devices on its data network for problems. When an alarm condition is detected, the management system identifies the problem's precise location, alerts network operators and allows them to restore data flow in seconds by reconfiguring communications devices or rerouting data around the trouble spot.

A corporate manager must also document the performance of his department, so the company can allocate resources to match the department's needs and the manager can evaluate workers fairly. Similarly, network management sys-

Alberding is the director of marketing of network management systems for Case Communications, Inc. in Columbia, Md.

tems provide statistical reporting on a network and its components to assist in the planning and administration of resources.

Modems, multiplexers and other communications devices, like employees, can still do the job without a manager. However, with a growing network, pinpointing the exact source of network problems and correcting them becomes more difficult.

With a network management system, a skilled technician can monitor and control the entire data network from a central point or, with the proper password, from a remote site anywhere on the net-

For a company with a shortage of trained troubleshooters or with users who have limited technical training, central restoration saves time and money by eliminating the need to dispatch special staff across the country to remedy problems.

### User needs

A typical user of a comprehensive entry-level network management system may have 10 to 15 communications lines, connecting users of one or more host computers, perhaps IBM 4300 series mainframes or other large data processing machines.

The company relies heavily on the network for its daily operations and cannot afford downtime. However, its existing data network was probably not planned and implemented from scratch; instead, it evolved as communications needs grew.

In response, the company combined different types of transmissions and equipment to suit various locations and users.

A network management system must protect the user's investment in existing data communications equipment by operating with a wide range of communications devices across different transmission techniques.

The ability to isolate a network problem is particularly critical for users transmitting data in multivendor environments. When a transmission problem occurs, users can contact the proper vendor after pinpointing the malfunctioning line or equipment.

Users may have a combination of synchronous and asynchronous communications devices. However, the integration of these transmission techniques is not a function of the network management system.

Transmission is handled at the data transport level by communications devices, through the use of emulators or gateway cards.

For multivendor environments, many network management system vendors offer wraparound boxes that enclose other vendors' communications devices and provide diagnostic capabilities needed to detect network problems.

Another approach to multivendor environments is to operate management systems concurrently from different vendors.

This is accomplished using a main management system with a flexible operating system, allowing the operator to control other systems through on-screen windows at a single monitor. In the future, a standard interface between humans and machines would eliminate the need for wraparounds and multiple systems.

The purpose of choosing a network management system that works with many vendors' equipment is to make sure the system will not limit an expanding network.

Net management can be useful in the long term if it allows users to upgrade the data network and the management system as communications needs grow.

### Network management functions

There is no standard network management system, and vendors offer a confusing assortment of

products that claim to manage nets. Accounting software packages, protocol converters and dial backup devices are pieces of the puzzle. Often offered as network management tools, each provides just one or two functions of overall network management.

A complete management system addresses four basic areas:

■ Problem notification. When an alarm condition has been detected, the network management system audibly alerts network operators and displays the alarm on its monitor. To help identify problems quickly, network lines and units are numbered, and alarms are often color-coded by priority.

Many systems offer graphics displays that let operators see the precise network topology of a trouble spot. When there are many alarms, operators can select which to correct immediately, while others are stored in the system's memory for later action.

■ Problem identification and testing. To diagnose a problem, some management systems scan all network equipment to verify that data is flowing smoothly.

On other systems, the devices themselves have built-in diagnostics and can detect alarm conditions based on preset thresholds. These devices alert the management system to problems.

■ Service restoration. Once network operators have been notified of a potential problem, they can handle it immediately.

With an unacceptable signal-tonoise ratio, for example, an operator can simply drop the transmission speed over the problem line from 9.6K bit/sec to 4.8K bit/sec. For larger problems, network oper-

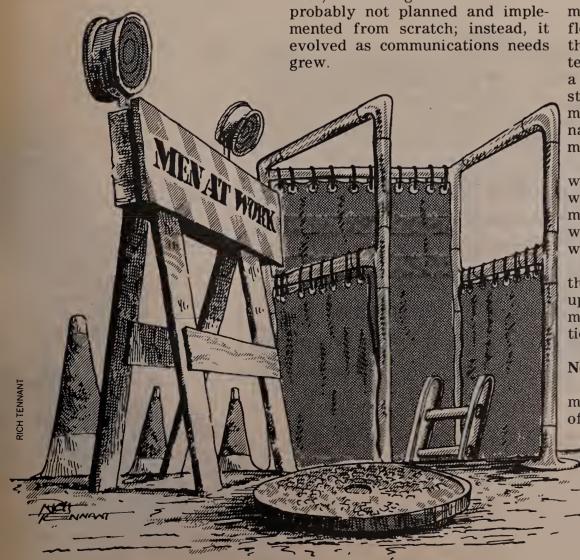
ators can switch quickly to dial backup equipment.

Administration, control and planning. Beyond operational troubleshooting, a network management system should log network operations on a central data base for offline reporting and analysis. This saves the operator the task of keeping a log.

To provide a printed record of each network alarm, the management system automatically generates trouble tickets that note problems as they occur.

Summaries of trouble tickets and other network information are used to create a variety of reports for administration, internal billing, report generation, modeling and resource planning. They highlight trends and potential problem areas so operators can take preventive action.

Because managers, rather than Continued on page 34



technicians, usually want this information, it must be presented in plain English, using color displays with graphics, simple menu structures and on-line help facilities.

### Physical makeup

To address these four areas, vendors offer systems in a variety of hardware and software configurations. Comprehensive net-

work management systems, ranging in price from \$16,000 to \$250,000, typically include a processor, a monitor or graphics terminal and a hard-copy output device. They also usually include system and applications software, data storage and one or more channels for connecting to the network.

Typically, network management systems have inde-

pendent processing capability — they are not simply management software running on a host computer.

They are built around a 16- or 32-bit processor. The powerful 32-bit processor, which is coming down in cost, is becoming the standard offering.

Its speed makes possible real-time graphics displays of network topology, rapid operator response, remote monitoring and more functionality of the network data base, including sophisticated analysis and report generation.

Network management systems tend to run either Unix or proprietary operating systems. The trend now is toward Unix, which is designed specifically for hardware migration and does not tie users to one product line.

Portability among hardware systems ensures that when new processors are available, they can be easily incorporated into an existing system without requiring extensive software modification.

Running under the operating system is management system software that can address the changing configurations of growing networks. Along with this, tools such as relational data base managers and highlevel graphics packages allow the user to see network topology and analyze statistical data.

Management systems may come with monochrome or color monitors. Graphics monitors can create visual business reports. Similarly, output devices may be anything from dotmatrix to laser printers, or

# usually include data storage. ??

plotters for providing color hard-copy output.

Along with these hardware features are wraparound units, high-capacity mass storage and main memory and channels through which cables connect the management system to the network. Management systems can be attached to the network at one or more points.

They usually connect to a device at the central site, such as a ring concentrator, that compacts many lines of data onto fewer composite lines. Multiplexers on the network may need add-on boards, such as network control access modules, that allow them to provide diagnostic information to the system.

International Data-Corp., a Framingham, Mass.-based market research firm, says the market for network diagnostic and management systems will grow 20% to 30% annually over the next three years. The market is projected to rise from \$273 million in 1986 to \$575 million by 1989.

The choice of a network management system depends on a user's needs. But whatever the choice, based on the cost of downtime and the central network control's cost saving, such systems can pay for themselves quickly.

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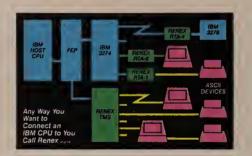
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### NETWORK CULTURE

### The human element



### Is your net compatible with your users?

### **Continued from page 1**

get the job done. They want to know about the application software and whether the network can meet the needs of a community of computer users.

A network is not a mass of computer hardware. Before any hardware is put into place, there is already a network of people, working on projects, ideas, products and services. They are concerned with the timely and successful completion of the task that brought them together in the first place.

Whether the network engineers thought about it or not, behind the hardware and software of the computerized local-area network is a unique philosophy about how those using the network will work.

Like corporate culture, network culture is not apparent to the casual observer. There is an ethos built into the system. The specific combination of software and hardware assumes and dictates a particular kind of work relationship. It determines whether the users are tightly or loosely bound to each other and whether they work in a pyramidal or egalitarian organization, a hier-

Randall lectures on the structure and design of local-area networks for the Management Development Foundation and the Data Processing Managers Association.

archy or heterarchy. The assumptions that are built into the network form the basis of the network culture.

The net tells the users whether they are trusted or suspect, responsible or clumsy and whether their task is confidential or public. It tells the workers how to approach their work, and it dictates their work environment.

Each network is a statement about how the users are expected to work together and how they are to form alliances, groups and exclusive domains. Even though the philosophy is built into the network design, it is not adequately described by network jargon such as "CSMA/CD," "10M bit/sec" or "fiber optic."

For a business to implement a computerized network successfully, it must be careful to match the needs of the people and their work patterns with the network system design.

Many organizations that have installed networks discover after the fact that they have to retrofit the users to the net and that the network has altered or even damaged the fabric of working relationships. This malaise is below the surface. Users complain that the network is not friendly, or that it's not on the same team. They may not realize they are subject to a system that has changed the working relationships within the office.

To optimize an office system, a number of questions should be asked before

a system is specified. A consultant should examine the existing working environment, the tasks being performed and the plans for growth and then factor this information into the system's design. The consultant must acknowledge that in every office, there is already a human network in place. To serve the community of users, a network should be chosen to match the existing working environment.

Two examples from within the same company illustrate this key concept. The company is a major pharmaceutical firm that has been using a Sperry Corp. mainframe computer for virtually all of its computing needs.

In a recent move, the board of directors decided that all members of the medical research department would be issued personal computers to boost research productivity, to share data and to relieve the mainframe. They decided to include a local-area network in the specifications.

The research department of the firm is a highly secure operation. Its data is the core of the company's future. Data security is vital to the company, and it is imperative that data not be lost, damaged or destroyed. As a working team, they are tightly organized, with a clear line of control from the medical director down through each of the subgroup directors to the data entry and secretarial staff.

Continued on page 36

From page 35
Certain staff members have access to the data; others are only cleared to enter data. Because the future of a company rests on the integrity of this body of data, the network needs a tight security system and a centralized backup.

Physically, the medical research department covers a small area.

It stretches over a 400-foot, straight hallway. Workers were informed they might have to move to other quarters in the near future. For that reason, some consultants might select a particular network simply for ease of changing location.

Another factor considered was the system's need to upload data to the mainframe, and certain members of the staff would need easy access to the mainframe. Some users required being able to perform number crunching at their local workstations.

There were additional minor requirements for secure modem communications and for distant access to the system within the building. On the basis of these needs, a minicomputer system was judged to be inappropriate, and a network of personal computers was chosen.

clearly, in this setting where the organization of the tasks is centralized and secure, the network that favored centrality suited the users' needs. This stands in stark contrast to another department of the same business, where a network of the same sort is totally unsuited.

The sales and marketing department is planning to add a network to its family of personal computers. Timing is more open-ended, because the marketing network has lower priority than the research group network.

The physical setting of the marketing department has a different ambience than that of the research group.

In the research area, workers have private offices. The marketing group works in a large open space with portable partitions that can be moved to create temporary offices and small clusters of workers. The same flexibility should be designed into their computer network.

In the marketing group, there are few high-security data files. Client lists are the most guarded data, and even those are not considered particularly private. The working groups change depending on the tasks at hand, and it is important that the network be as flexible as the group boundaries.

In this setting, the use of tight, centralized security would stifle the group dynamic that allows the marketing group to function. The marketing staff needs to alter group lines quickly, and it must be able to reassign users from one task to another. It is in the best in-

terest of the group to be able to alter the whole network structure to respond to changing short-term conditions.

The cost of growth was another factor to consider in each network. For example, the Novell, Inc. Star network was chosen for the research group because it expands to accommodate 24 users according to a step function.

The cost of an additional user is then merely the cost of another network board. When the 25th user is included, a new file server must be added.

In the medical research department, the system was configured at capacity, 24 users, on the first day. Because there are no plans to expand the number of users in the immediate future, the Novell system is ideal.

In contrast, the marketing group expects to start with a small network and allow the network to grow on a continuous basis. The IBM PC Network, with its gradual expansion capability, was seen as an asset to the marketing staff but was of no value to the research group.

The key point in these two examples is that the atmosphere and working rela-

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tionships and of the two office settings are radically different. These differences cannot be violated by the structure of the installed networks. If the network breaks down the relationships of the users, the working atmosphere suf-

ing computer terms and hardware specifications, but rather, they should work with the users, examine the growth plans and then design a network to meet these needs.

### **Vendor? Consultant?**

All too often, the consul-

These vendor/consultants often do their clients a disservice by forcing users to conform to the limited range of hardware that the sales representative sells.

Before committing to specific systems, companies

culture of the various localarea networks can provide the information that allows a perfect match between the needs of the working team and the culture of the network. Z

### Policy from page 26

part of the strategy behind the introduction of Sen. Robert Dole's (R-Kan.) Telecommunications Bill of 1986 and other legislative attempts to free the BOCs from the Modified Final Judgment. Although the bills have little or no chance of becoming law, their intent is to show the Justice Department and Judge Greene which congressional leaders back future business opportunities for the BOCs.

All of this hullabaloo, however, is not to suggest that Greene will go along with the recommendations Huber submits to him. Greene has many options: He could take no action whatsoever, reject the report entirely or accept it with modifications. The excitement over The Huber Report is building, perhaps because of — and not in spite of — Dole's bill and the others that may follow.

The Huber Report will probably recommend that the BOCs be allowed into equipment manufacturing and be permitted to offer some information services. The restrictions on interexchange, or long-haul, services will remain as they are for the most part, at least until the 1990 report.

However, Huber and his staff are likely to recommend that strict regulatory restrictions be imposed upon the BOCs to protect and promote competition.

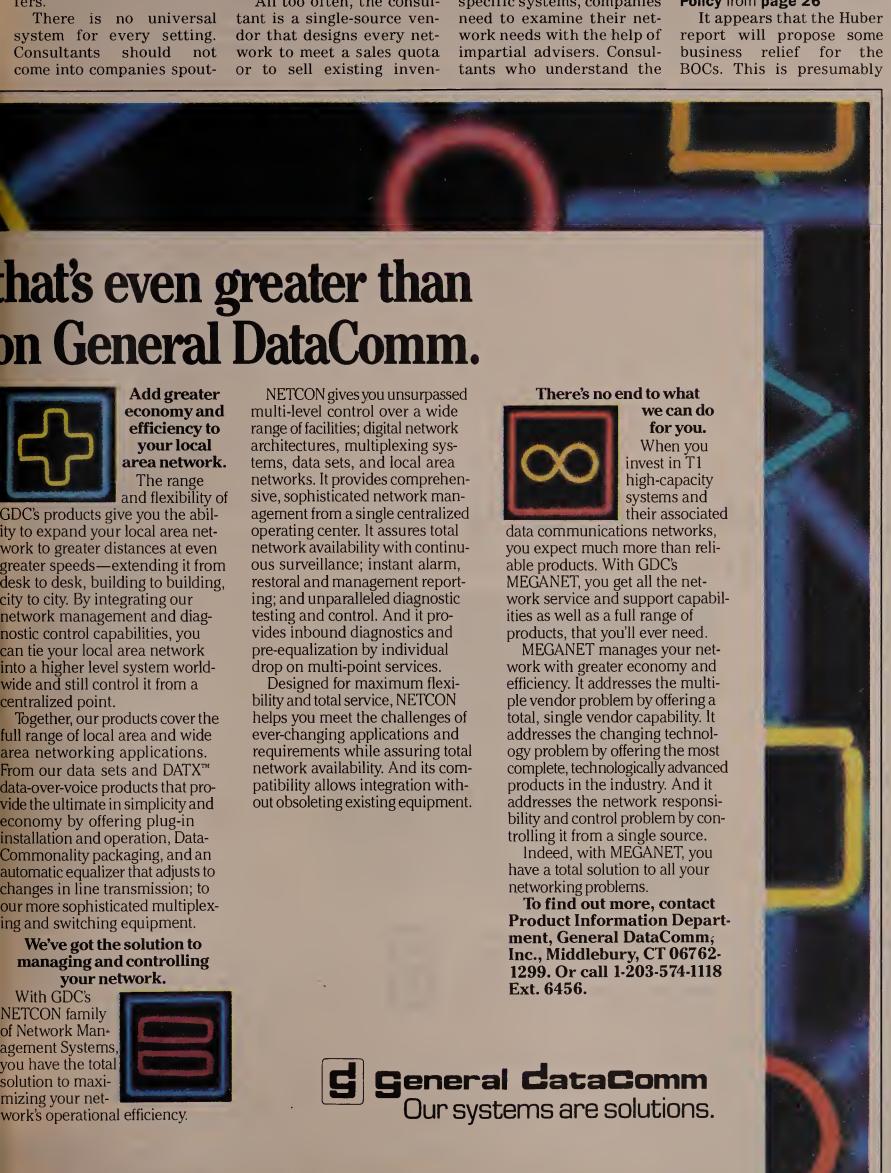
In other words, there will be no free ride for the BOCs. They will get some business relief, but they will have to give up something in return.🔼

From page 27

communications systems. The vendor structure is still set up to serve MIS, telecommunications, personal computer and office systems communications of the end-user world.

Computer vendors don't understand telecommunications, PBX vendors don't understand data, and personal computer suppliers don't understand much except personal computers. The evolution of user demand dictates that systems integration services become a major feature of the telecommunications industry in the future.

It's a nice buzzword: "complex systems integration." No doubt consultants will roll out their seminars and the market researchers their zillion-dollar market projections, and the whole thing will become a hot topic. This time, however, it might be something the industry can use.



### Disoss from page 1

Doyle, senior communications analyst at International Data Corp., a Framingham, Mass.-based market research firm, said Burroughs is more of a second-tier participant in the office systems market along with other members of the Bunch, which are all manufacturers of non-IBM plug-compatible mainframes. Bunch is an acronym for Burroughs, Univac, Inc. (now Sperry Corp.), NCR Corp., Control Data Corp. and Honeywell, Inc.

These companies, with the exception of Control Data, are attempting to win a larger share of the expanding office systems mart and thus are embracing Disoss. Honeywell, Sperry and NCR have announced their intention to sup-

ply products that support Disoss. But shipments of their products are not expected to begin before year's

In March, Sperry said it would formally introduce its Disoss tools by mid-year. But the announcement was later pushed back to the fall. A few months ago, Sperry and Burroughs merged and became the second largest U.S. computer manufacturer. Both companies have begun the process of integrating their currently incompatible product lines

Ofisbridge, which is generally available, supplies basic Disoss support: Burroughs and IBM Disoss users can exchange final form or revisable documents or store them on an IBM host. Final form docu-

ments cannot be modified, only viewed or printed. Changes can be made to revisable documents.

Translation of documents from one vendor's format to the other's format is done on the Burroughs system. That allows a mainframe to be used more efficiently, Burroughs officials claimed. Many users have critized Disoss because it consumes massive amounts of CPU cycles.

Unlike other Disoss implementations, Ofisbridge does not enable a Burroughs minicomputer to run Disoss library services. These services would turn a Burroughs computer into a Disoss node able to store and route documents. With the initial release of the product, a Burroughs user sending a docu-

ment to other Disoss users would have to move the document from a Burroughs system to an IBM mainframe where Disoss would then route the documents.

Surging Disoss support seems to stem more from an acquiescence to IBM's marketing might rather than any fondness of Disoss itself. The product has been roundly labeled as a cumbersome tool with limited capabilities. Despite the product's shortcomings, Doyle estimated that 400 Disoss licenses have already been sold and the number could increase to 1,000 in the next few years.

A principal limitation results from the wide breadth of functions supported by different products that fall under the Disoss umbrella. Disoss can be accessed by application programs that run on such systems as the IBM Personal Computer, System/36, Displaywriter, System/38 and IBM 370 series mainframes. Disoss documents must conform to two IBM standards: Document Interchange Architecture and Document Content Architecture.

Ofisbridge requires either Burroughs' SNA/SDLC or SNA/X.25 gateway software. The product supports either traditional 3270 emulation packages or an IBM LU 6.2 emulation capability that is bundled with the software. Ofisbridge costs \$2,300. \(\overline{\over

### Wager from page 2

ment and large business, said Ronald Coleman of Tel-Optik.

Greene's decision to allow Nynex to enter into a conditional agreement with Tel-Optik without having a waiver does not represent a policy change, said Nancy Garrison, assistant chief of the communications and finance section in the Department of Justice's Antitrust Division.

"We and Nynex agree that Nynex must seek a waiver before it exercises that option," she added.

"We haven't taken a position on whether the waiver will be granted."

Nynex is interested in the venture because, "There is a tremendous amount of international telecommunications business and tremendous anticipated growth," said Pete Goodale of Nynex. Under the Modified Final Judgment issued by Greene at the time of AT&T divestiture, the BOCs are forbidden to participate in interexchange business. Interexchange service involves any call originating within a local access and transport area and terminating outside that Lata.

Nynex plans to pay \$10 million for Tel-Optik's stock. This sum will be held in trust until the deal is completed. If Nynex does not win permission to complete the purchase by July 1988, the BOC will lose its \$10 million, said Nynex spokeswoman Vickie Desidero.

One event that could change current regulations is a Justice Department report that will contain proposed amendments to current regulations that would reflect industry changes, Justice's Garrison said. 2

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Aug. 18-19, Chicago — Data Communications and Networking for the IBM PC XT/AT and Other Compatibles. Also, Aug. 27-28, Washington, D.C. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Aug. 18-20, Boston — Data Networks: Management, Operation and Control. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Aug. 18-20, Chicago — Planning an EDP Disaster Recovery Program. Contact: Computer Security Institute, Dept. ERC, 360 Church St., Northborough, Mass. 01532.

Aug. 18-22, Washington, D.C.—Radio Wave Propagation for Communications System Design. Contact: The George Washington University School of Applied Science, Washington, D.C. 20052.

Aug. 19, Plymouth, Mass. — Achieving Excellence: How to Implement the New "Excellence-Oriented" Management Style in Your Department or Company. Also, Aug. 20, Worcester, Mass.; Aug. 21, Springfield, Mass. Contact: Career-Track Seminars, 1800 38th St., Boulder, Colo. 80301.

Aug. 19, Chicago — The IBM PC Data Communications Survival Course. Also, Aug. 20, Rochester, N.Y.; Aug. 21, Boston; Aug. 28, Dallas. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Aug. 19-20, Washington, D.C.—Advanced Communication Architecture. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Aug. 19-21, Washington, D.C. — Advanced Data Concepts. Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

Aug. 19-22, Anaheim, Calif. — Data Communications: Components, Systems and Networks. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 20-21, Osterville, Mass. — Introduction to Fiber-Optic Communication Systems. Contact: Hinckley Communications, 14 Parker Road, Osterville, Mass. 02655.

Aug. 20-22, Indianapolis — Data Communications: Fundamentals and Beyond. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

Aug. 20-22, Boston — Data Administration and Data Resource Development. Contact: Digital Consulting Associates, Inc., 6

Windsor St., Andover, Mass. 01810.

Aug. 20-22, San Diego — Hands-On Troubleshooting Data Communications Systems and Networks. Also, Aug. 25-27, Dallas. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

Aug. 21-22, New York — Introduction to Communications Security. Contact: Computer Security Institute, Dept. ERC, 360 Church St., Northborough, Mass. 01532.

Aug. 22, Boston — Macros on Lotus 1-2-3. Contact: Boston University Metropolitan College, 775 Commonwealth Ave., Boston, Mass. 02215.

Aug. 23-24, Atlanta — Softeach: The Computer Products Training Forum. Contact: Softsel Computer Products, Inc., 546 North Oak St., P.O. Box 6080, Inglewood Calif. 90312-6080.

Aug. 25-27, Chicago — Telecommunications Systems: Technology and Planning. Also, Sept. 15-17, San Francisco. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 25-29, Santa Cruz, Calif. — Fault Tolerant Computing. Contact: Institute in Computer Science, University of California Extension, Santa Cruz, Calif. 95064.

Aug. 26-28, San Mateo, Calif. — Interconnect '86: The Second Annual West Coast CPE Show. Contact: United States Telecommunications Suppliers Association, 33 N. Michigan Ave., Chicago, III. 60601.

Aug. 28, Monterey, Calif. — Netbios-TCP/IP Interface Specification Forum. Contact: The Mitre Corporation, Burlington Road, Bedford, Mass. 01730.

Sept. 2-6, Chicago — Office Automation Society International's Fourth Annual Conference. Contact: The Information Exchange, Office Automation Society International, 15269 Mimosa Trail, Dumfries, Va. 22026.

Sept. 4-6, Kansas City, Mo.— The Second Computer and Business Equipment Showcase. Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Sept. 7-10, Nashville — The Southeastern Telecommunications Association (Seta) 1986 Annual Conference. Contact: Seta, P.O. Box 901, Richmond, Va. 23207.

Sept. 9, Arlington, Va. — National Capital Datapoint User Group Meeting. Contact: Margaret Valavanis, OSP/WHS/DCOAR, The Pentagon, Room 1C730, Washington, D.C. 20301.

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Must be able to communicate effectively in writing; experienced in analog and digial circuit design; familiar with a broad spectrum of telecommunications systems including radio, microwave and telephone, telemetering and supervisory control. Requires expertise in data communications systems and equipment and information theory and practice.

Requires minimum of five years applicable experience in telecommunications with strong emphasis in network design, traffic engineering, vendors and carriers and a high level of computer literacy.

Should have a degree in electrical/electronic/ communications engineering from an accredited university, be a registered professional engineer or in preparation.

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The New York City Housing Authority will receive sealed proposals at 250 Broadway, New York, N.Y. 10007, in Room 711 on the 7th Floor from 9:00 A.M. to 4:30 P.M. daily until 12:00 Noon of Monday, September 8, 1986; thereafter these bids are to be submitted in Room 2403A on the 24th Floor until 2:00 P.M., of September 8, 1986 after which time no further bids will be accepted for an ENERGY MANAGEMENT INFORMATION SYSTEM.

The deliverables will include further definition of Business Systems Design; the Computer System Design; Coding, Testing and Implementation.

Proposals will be publicly opened and read at the office of the New York City Housing Authority at 2:00 P.M. in Room 2403-A on the 24th Floor, on Monday, September 8, 1986.

The selection will be made on or about September 24, 1986, after all properly submitted proposals have been evaluated, rated, and adjusted in accordance with the terms of the

Requests for Proposal (R.F.P.) can be obtained daily at New York City Authority offices, 250 Broadway, in Room #711 on the 7th Floor during the business hours of 9:00 A.M. to 4:30 P.M., weekdays from Mr. Wm. Steinmann or from Mr. Nicholas Calace.

A bidders meeting will be held in the New York City Housing Authority offices at 250 Broad-way, New York, N.Y. 10007 in Room 2403-A on the 24th Floor on August 27, 1986 at 2:00 P.M.

Inquiries regarding this R.F.P. may be made by calling Mr. William Steinmann at (212) 306-3721 or Mr. Nicholas Calace at (212) 306-3705.

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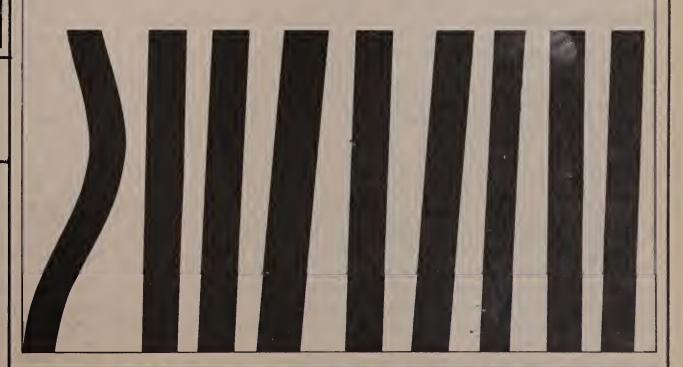
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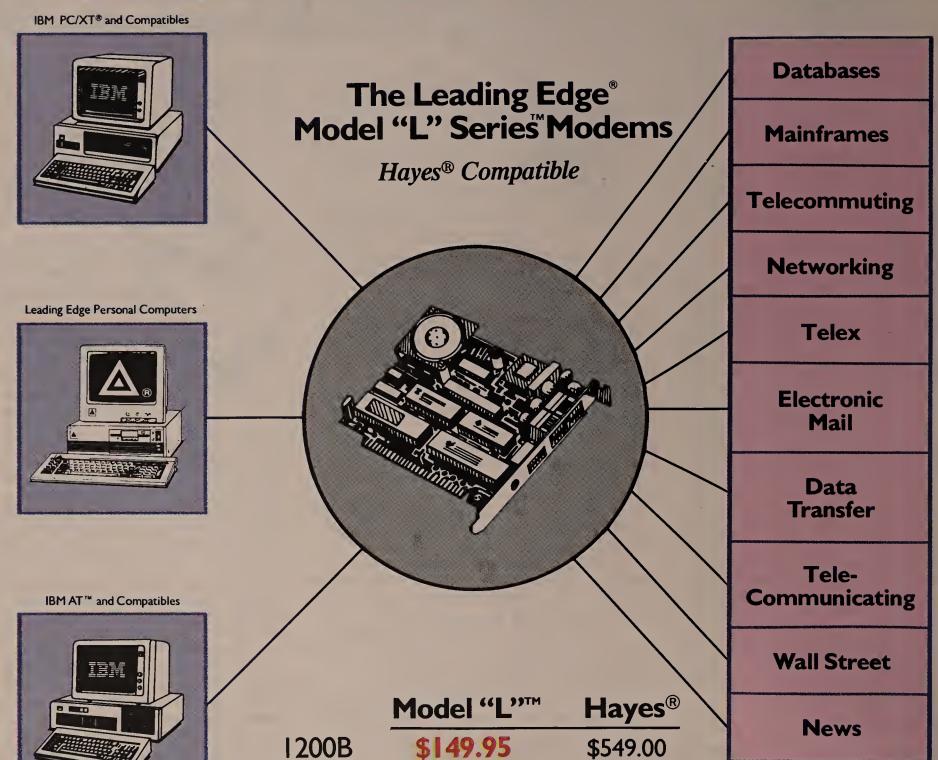
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